GAS JOURNAL

VOL. 273. NO. 4678 105TH YEAR JANUARY 28, 1953

SIX-POINT ECONOMY PLAN

LORD LEATHERS, Secretary of State for the Co-ordination of Transport, Fuel, and Power, has been asked by the Association of British Chambers of Commerce to appoint a special group of experts drawn from industry and commerce as well as from the two industries concerned to examine in all its aspects the problem of securing economies through co-ordination of purely administrative functions of the nationalised gas and electricity industries. The Association, which has had an assurance from Lord Leathers that the question of administrative costs in these industries is 'receiving active consideration,' has studied for several months those items of administrative expenditure incurred by gas and electricity boards which relate to similar functions and has submitted to Lord Leathers a memorandum containing statistics which suggest that economies could be effected without stifling the spirit of competition and without involving any integration of operational functions which should remain separate and distinct.

On p. 199 we give extracts from the memorandum which show that in 1950-51 the area boards spent nearly £23¼ mill. (gas £4,759,855 and electricity £18,466,414) under six administrative headings, all relating primarily to meter reading and collection of revenue—functions which are much the same in each case. In setting the figures side by side comparisons between the amounts expended by the two industries are not suggested, having regard to fundamental differences between them. There are six points in the economy plan envisaged by the Association, corresponding to the six items in the table set out in the memorandum: (1) Joint meter reading and collection; (2) savings on printing and stationery resulting from joint accounting; (3) similar consequential savings on postages and telephones; (4) pooling would lead to economies in rent, repairs and maintenance; (5) co-ordination would reduce transport and travel expenses; and (6) there would be scope for economy in administrative salaries and wages as soon as the principle of co-ordination had been accepted. The Association says it does not wish to minimise the difficulties involved nor presume to be fully conversant with all the administrative machinery involved. It recognises, for example, that the boundaries of the 12 gas board and 14 electricity board areas do not coincide, but it does submit that the obstacles may not prove to be so difficult to surmount in practice as might appear at first sight to those engaged in the day-to-day operations of the undertakings. 'It is no part of the Association's intentions that the two different undertakings should be amalgamated or integrated in any way that would stifle the competitive spirit between them,' says the memorandum, 'but the possibility of saving even a relatively minor part of so massive a total sum must justify a re-examination of the problem.'

Joint reading of gas and electricity meters was tried as a war-time expedient in a few districts and it has since been widely advocated as a post-war economy measure, but 'considerable administrative difficulties' (in officialese) have so far prevented anything more than discussion. The Gas Council has talked it over with the British Electricity Authority, but both have been aware that among the unions of which many of the meter readers and collectors are members there is a disinclination to disturb the present separate arrangements. But neither industry has abandoned hope that some generally acceptable plan will emerge. Indeed as recently as last week there were informal discussions between the Gas Council, the B.E.A., and a number of unions concerned—discussions which we were informed were proceeding in a spirit of goodwill. So far the discussions have not proceeded beyond the exploration of possibilities for carrying out isolated experiments in co-ordination. If joint meter reading is impracticable then much of the research carried out by the Association of British Chambers of Commerce will fail to bear fruit. The memorandum seems to us to be a reasonable one in every way and in the discussions now taking place it should be given the consideration it deserves.

SULPHATE OF AMMONIA

AGAINST the background of increases of 13½% in the world industrial demand for nitrogen and of approximately 7½% in world agricultural consumption, it is not without some concern that we read in the annual report of the British Sulphate of Ammonia Federation that total deliveries of sulphate of ammonia for British home agricultural consumption in the year ended June 30, 1952, are estimated to have been 22.3% less than in the previous year, sales for mixing and for straight use being affected in about equal degree. Although, together with the coking industry, it is the major producer of sulphate, the gas industry cannot in any way be blamed for the decrease ; actually the total United Kingdom production of nitrogen products in the calendar year 1951 was 5.7% higher than in 1950 ; output of fertiliser products increased by 0.5% and industrial forms by 19%.

The policy of subsidy withdrawal from fertiliser prices was completed by the middle of 1951, but trade in sulphate of ammonia did not suffer noticeably until the reduced demand for compound fertilisers began to affect sales to mixers. Even at the unsubsidised selling prices for nitrogen, sales were normal until 12 months ago. Prices rose again in February, due to transport and other charges, and this shock to the trade came at a most unfortunate time—the beginning of the spring consuming season. Following rumours of price reductions due to a break in jute prices and a fall in phosphate rock prices, the fertiliser market became very weak by the end of March, and price reductions announced on April 1 did little to improve matters. At the end of the season, which came very early, all buyers were concerned to reduce stocks, as it was clear that further price reductions would occur on July 1. Conditions in May and June were the exact reverse of those of the two previous years, when fertilisers were being stock-piled. In those months occurred the biggest drop in sulphate of ammonia sales compared with previous years and the full effect of the serious recession in compound fertiliser sales was felt.

Exports of sulphate of ammonia from the United Kingdom during 1951-52 exceeded 348,000 tons—the highest figure since 1931-32—and showed an increase of 45% on 1950-51. Allocation to overseas markets was controlled by Government departments. When it became apparent in the early spring that ample provision had been made for the home market, allocations to Commonwealth markets were increased and towards the end of the season large shipments were made to the Far East. The year under review was the 55th year of propaganda work undertaken successively by past and present organisations and was again marked by considerable work by the research department on many aspects of manufacture, notably the determination of impurities in saturator liquors, and tentative methods of analysis were circulated to members. These analytical methods are of increasing importance because the reduction in imports of sulphur has made the production of sulphate of ammonia more dependent on acid derived from pyrites and spent oxide. The drive to improve the quality and uniformity of the product has been intensified, and experiments to that end are proceeding at a number of works. Experiments have been started on the protection of metals from corrosion in acid liquors by the application of electro-chemical methods, and the report reveals that although many teething troubles have been encountered, the results so far obtained are encouraging.

Mr. F. C. O. Speyer, C.B.E., continues to fill the office of Chairman, with Mr. Michael Milne-Watson, Chairman of the North Thames Gas Board, as Vice-Chairman. The area boards are well represented on the Council and committees of the Federation by Mr. W. S. Johnston (Scottish), Mr. E. Crowther (Northern), Mr. W. Hodkinson (North Western), Mr. E. H. Harman (East Midlands), Mr. W. K. Hutchison (South Eastern), and Mr. J. H. Dyde (Eastern).

SAMPLING AND QUALITY CONTROL

NO one will dispute the desirability of establishing a scientific basis for the sampling and testing of the materials used in the construction of carbonising plant and the raw materials of gas manufacture but few will be prepared to go far into the elusive mathematics of chance and probability. Most of us will accept the recommendations of the specialists and conduct our sampling according to their rules supplemented by the dictates of common-sense. The paper by E. H. M. Badger at the research meeting of the Institution of Gas Engineers does not indeed go far enough back into the theory to give us a comfortable feeling of understanding but most of his propositions are sufficiently convincing to command our respect, though one or two are not easy to accept.

For instance, difficulty in obtaining representative sampling is graded from easy for gases, slightly less so for some fluid mixtures, to much more so for solids. One would place granular solids, such as small coal, between fluids and solids with a variety of pieces from large to dust—which indeed Mr. Badger recognises. But his statement that the sampling of coal is more difficult than that of silica refractories is not easy to accept. You cannot sample bricks and shapes with a shovel and you cannot practise any sort of preliminary mixing or breaking down before taking your increments.

Indeed the difficulty of quality control of refractory bricks and shapes presents a very serious problem in the safety and durability of the structures into which they enter. Sampling can only be done by the random selection of individual pieces. But the method or principle of such selection may differ as between sampling at the manufacturer's works and at the reception end by the purchaser. The manufacturer is conscious of the risk that not every portion of the kiln load is equally heated though he does his best to ensure that every portion is adequately heated. He will therefore select his samples noting where they have been in the kiln, and will test separately. He will wish to do his own rejection of defective goods if any is to be done. The attitude of the purchaser is somewhat

different. But even at that end the selection of the samples seems to involve so much chance that it requires all the mathematics of the specialist to console the supplier for the rejection of a large and valuable consignment.

Mr. Badger does not like such a method of sampling as that described on page 31 of *King's Manual*, Section 5, but we are not convinced that his suggestion is any more practicable. It is to be noted, by the way, that in the batch system it is laid down that 'every piece was visible'; it was not such that only the bricks near the surface of the stack were accessible.

Mr. H. M. Spiers subjected this section of the paper to a very close scrutiny for which we are grateful. Particularly in regard to the value of specific gravity criterion readers can refresh their memories by a glance at pages 8 and 9 of the Section of *King's Manual*. It will be evident that not only is firing directed to the realisation of a maximum conversion of quartz to tridymite but that prolonged use at high temperatures results in a complete conversion to tridymite. The figures one needs to keep in mind are quartz 2.65, cristobalite 2.32, and tridymite 2.28. Mr. Spiers' remarks on the selection of a limiting specific gravity will then be understood.

The conclusion that a satisfactory control can be obtained from a selection of no more than 20 samples is comforting—but over what consignment should they be spread? The cost of sampling and testing can be considerable and if the conclusion is that 20 samples will be sufficient to ensure safety in 20,000 or more pieces it might be very valuable.

Turning to the sampling of coal some interesting points emerged. The suggestion of duplicate sampling is promising and merits very serious consideration. That plant should be so designed as to provide a definite accessible point for accurate sampling is reasonable. Something depends on what one is sampling for. If it is a question of sampling coal as fed to carbonising plant it will be generally possible to ensure pretty thorough mixing after breaking and there seems no great difficulty in getting a representative sample at that point. If, however, it is a question of checking the quality of consignments as received (if indeed such a check has much value in these days of restricted choice) all the difficulties mentioned in the paper will arise. There is one 'dark saying' the meaning of which is not clear—that when the results of sampling and testing are to be used, for instance, 'in the adjustment of thermal yields to a coal of standard ash and moisture contents it is more appropriate to work to *absolute standards*' (our italics). We presume this is explained in the rest of the paragraph. If so it is fairly clear.

Sampling enters so intimately into quality control, and the extent of the materials and their properties to be covered is so wide, that this paper will be read and discussed in many quarters—not least we suspect, among the younger technicians to whom much of the work will fall. 'It is doubtful,' said Mr. J. Foxton, 'if a large majority of those who require samples appreciate the amount of work' (supplemented we suggest by some imagination) 'involved in the collection of a true sample.' The same speaker sounded a note of warning whether some of this work was justified or even practicable having regard in each particular works to the labour and apparatus available. He also struck a note of sympathy with the non-mathematical in pleading mildly for the retention of the term 'average error'—not so far removed from common experience as the derivative 'standard deviation.' Still we must all do our best to act on Dr. Griffith's exhortation to master the contents of this admirable paper (and the discussion) and then to work out the best means in each of our own circumstances of giving effect to the principles and recommendations laid down.

KING'S MANUAL

WITH the publication of Section 1 the gas-making portion of the new *King's Manual of Gas Manufacture* is complete. The first five Sections now available cover all the orthodox methods of gas production now in use in British gasworks. Section 1 contains two chapters. Chapter I, 'Carbonisation,' is introductory; chapter II is a detailed treatise on carbonisation in horizontal retorts.

In Chapter I Mr. H. H. Thomas opens with the principles of coal classification with the Table of Seyler's classification converted to Parr's 'mineral-free' basis. He then proceeds to a study of the reactions which take place in the coal substance when heated in the retort, followed by the practical results of carbonisation, first in the horizontal retort and then in the continuous vertical. The chapter closes with a discussion of the efficiency of carbonisation and the graphs adopted by the British Gas Federation's Post-War Planning Committee to show the gas yields which can be regarded as satisfactory when carbonising the several standard British gas-making coals making gas at different calorific values.

Carbonisation in Horizontal Retorts is treated at full length by Mr. A. H. Savill in Chapter II. Here is brought together in classified form all the relevant data hitherto scattered over a wide range of gas literature from the pens of such authorities as Evans, Hunter, Moys, Paxton—all seasoned with Mr. Savill's own wide knowledge and experience in the design, construction, and operation of horizontal retorts. The theory of the built-in producer is thoroughly discussed, together with the design of horizontal retort settings and recuperators illustrated by informative drawings and sketches. It is interesting to note, in passing, how the older horizontal retort practice has been so developed and modified that it can hold its place with the newer verticals. Refractory materials are discussed from the point of view of horizontal practice. Control of settings and the heat balance are fully set out. And the several types of stoking machines are briefly but adequately described with clear diagrammatic drawings. This is a chapter which can be thoroughly recommended not only to the student but to the young technician in charge of a horizontal retort house.

Personal

Mr. W. T. Hird, Distribution Engineer to the Wales Gas Board, has been selected as a member of an Organisation for European Economic Co-operation mission to the United States to study recent developments in long distance gas transmission.

◇ ◇ ◇

Lieut.-Col. F. Geoffrey Falk, N.I.E.E., T.D., a Director of Falk Stadelmann & Co., Ltd., left London on January 25 by Comet on a business trip to East and South Africa. The company has four branches in the Union of South Africa, and is also opening a factory on the outskirts of Johannesburg, where it is hoped to assemble many of its specialities. Colonel Falk will be away for approximately nine weeks.

◇ ◇ ◇

Mr. R. J. McMillan has retired after 37 years' service as an industrial salesman with Vacuum Oil Company. His 33 years' experience in central London gave Mr. McMillan a profound knowledge and affection for the Metropolis. His work involved daily contact with the head offices of a wide range of British industries. Large department stores, cement manufacturers, London newspapers, civil engineers, gas and electricity undertakings, and head offices of banks were among the customers with whom Mr. McMillan was in regular contact.

Obituary

Mr. Sydney Maddocks, who had retired after 40 years' service with the former Commercial Gas Company, and prior to the war had attended every meeting of the company for 50 years, died at Westcliff on January 14 in his 83rd year. He was a freeman and liveryman of the Coopers' Company and was for some time a member of the Stepney Rotary Club.

◇ ◇ ◇

Mr. George W. Ellis, who was a Director of the old Berkhampstead Gas Company for eight years and occupied the chair for four years prior to nationalisation, died on January 6, aged 82 years. His son, Mr. G. W. Ellis, is the present District Engineer and Manager at Berkhamsted, now forming part of the Watford division of the Eastern Gas Board.

◇ ◇ ◇

Mrs. Elizabeth W. Grant, widow of Mr. William Grant, formerly Managing Director and Secretary of Alder and Mackay, Ltd., died suddenly from a heart attack on January 12. Mrs. Grant was the only child of the late Mr. Alexander Mackay who, with Mr. Henry Alder, was an original partner of the firm. Her son, Mr. Alastair Grant, is a present member of the board.

◇ ◇ ◇

Mr. Harold Baines, Commercial Assistant to the Middlesbrough Divisional General Manager, Northern Gas Board, has died at the age of 56. Mr. Baines, whose wife died less than 12 months ago, developed pneumonia a fortnight before Christmas, and died of complications on January 3. At a meeting of the divisional management committee the Chairman of the Board, Mr. E. Crowther, and the Deputy Chairman, Mr. J. R. Bradshaw, referred to the loss sustained by the Board and by the gas industry which Mr. Baines had served for 41 years, during which period he had never been absent through illness.

COKE OVEN CAPACITY constructed in 1952 as part of defence mobilisation in the United States was the largest ever placed in operation in a single year with the exception of 1943, according to the Department of the Interior. The completion of about 900 coke ovens with a capacity of about 5 mill. tons was exceeded only by the record war effort in 1943, when 993 new ovens with a capacity of 5,611,000 tons began turning out coke urgently needed to support steel production. The 1952 oven construction programme would have exceeded that of 1943 if the steel strike had not delayed the completion of a number of projects. Construction is now under way on 18 additional projects involving 1,300 coke ovens with a capacity of about 7 mill. tons. Most of these projects will be completed this year. Work is expected to be started on nine new projects involving 600 ovens with a capacity of about 3 mill. tons, not to be completed until 1954.

Diary

Jan. 29.—North Thames G.C.C.: Caxton Hall, Westminster, 2.30 p.m.

Jan. 30.—London Juniors: 'The End of the Line,' Miss A. C. Badcock (Watson House); 'Handling and Preparation of Iron Oxide Mixture,' G. F. Roberts (Kensal Green); 'Effect of Air Vitiation on the Combustion of Instantaneous Bath Water Heaters,' C. H. Taylor (Watson House); and 'Ladder Pilots for Central Heating Units,' F. C. W. Biggs (Watson House), 178, Edgware Road, W.2. 6.30 p.m.

Jan. 30.—Scottish (Western) Juniors: Annual Dance. Georgic Restaurant, Glasgow.

Jan. 31.—Yorkshire Juniors: 'Fuel Efficiency,' Dr. A. Fells. Grand Hotel, Barkers Pool, Sheffield. 2.30 p.m.

Feb. 2.—West Midlands G.C.C.: 'Dudley Room,' Queens Hotel, New Street Station, Birmingham. 2.30 p.m.

Feb. 3.—Midland Juniors: 'Medical Service in the Gas Industry,' Dr. F. H. Tyrer.

Feb. 3.—South Eastern G.C.C.: Caxton Hall, Westminster, S.W.1. 2.15 p.m.

Feb. 4.—Institution of Heating and Ventilating Engineers: 'Gas-fired Central Heating Units and Conversions,' L. W. Andrew and A. D. Billingham; at the Institution of Mechanical Engineers, Storey's Gate, S.W.1. 6 p.m.

Feb. 6.—Midland Section, I.G.E.: 'Oxide Purification in Towers,' R. J. Warr and E. T. Pickering (first presented at the annual meeting of the Institution of Gas Engineers in June, 1952); Queen's Hotel, Birmingham, 2.30 p.m.

Feb. 6.—Scottish (Western) Juniors: Paper by G. Scott, Uddingston.

Feb. 7.—Wales Juniors (North Wales Section): 'Bulk Supply to a Small Undertaking,' O. P. Cronshaw, Chairman and Convener, Clwyd and Deeside Group, and C. Butler, Distribution Officer, Clwyd and Deeside Group, Pavilion Cafe, Rhyl, 2.30 p.m.

Feb. 10.—Institution of Heating and Ventilating Engineers: 'Automatic Controls for Heating Equipment,' K. Ernest, Cardiff.

Feb. 10.—Wales and Monmouthshire (South Wales Sub-Section), I.G.E.: 'The Gas Manager and the Town Hall,' D. H. Griffiths.

Feb. 11.—London Juniors: Evening Visit, 6 p.m.: H. W. Nevill, Ltd., Leytonstone Bakery.

Feb. 14.—Scottish (Eastern) Juniors: Short Paper Day; Dundee.

Feb. 17.—London and Southern Section, I.G.E.: 'Preventive Maintenance with Particular Reference to Gasworks Plant,' W. Morland Fox. 17, Grosvenor Crescent, S.W.1. 2.40 p.m.

Feb. 18.—Institute of Fuel: Joint Meeting with Stanlow Branch of the Institute of Petroleum. 'Methane at Point of Ayr Colliery,' J. S. Young. Grosvenor Hotel, Chester. 7.30 p.m.

Feb. 19.—Midland Juniors: Half-day Visit to Joseph Lucas (Electrical), Ltd., Birmingham.

Feb. 19.—Eastern Section, I.G.E.: Short Paper Day: 'Automatic C.V. Control,' K. R. Mortimer. 'The Trend of Gas Consumption and its Effect on the Future,' A. Collinson. 17, Grosvenor Crescent, London, 2.30 p.m.

Feb. 20.—London Juniors: 'Plastics,' J. M. J. Estevez, 6.30 p.m.

Feb. 21.—Yorkshire Juniors: 'Spectroscopy in the Gas Industry,' P. Egan, Harrogate.

Feb. 25.—Scottish (Western) Juniors: Evening Visit: Glenpatrick Carpet Factory, Johnstone.

Feb. 25.—Western Juniors: Visit to Works of Lysaghts, Ltd., Bristol.

Feb. 26.—Midland Section, I.G.E.: Joint Meeting with Institute of Sewage Purification; 'Further Experimental Work on Gasworks Liquor Treatment,' A. J. Clifford and J. T. Rees; Birmingham Chamber of Commerce, 2.30 p.m.

Is Joint Meter Reading Practicable?

Industrialists Ask for Full Investigation

THE Association of British Chambers of Commerce has urged the Government to encourage administrative co-ordination between gas and electricity boards as a means of reducing costs. In a memorandum sent to Lord Leathers, Secretary of State for the Co-ordination of Transport, Fuel and Power, the Association points out that in 1950-1, of the total operating costs of the B.E.A. (£209 mill.) nearly £18½ mill. (over 9%) alone was spent on purely administrative services in connection with distribution. Comparable costs were also incurred in a similar manner by the gas boards. The main recommendation in the memorandum is that a special group of experts drawn from industry and commerce, as well as from the gas and electricity boards, should be appointed to examine the problem. While cautioning that the problem of joint meter reading can scarcely hope to be effective as an isolated measure, the Association suggests that limited administrative functions such as meter reading and collection, and the rendering and collection of accounts might be pooled. This should be followed by co-ordination in the use of transport, premises and other services.

The memorandum goes no further than to suggest that, *prima facie*, it should be possible, through the co-ordination of certain purely administrative functions, to achieve economies in expenditure. This could be effected without in any way stifling the spirit of competition between the two undertakings, and without involving any integration of operational functions which, in the view of the Association, should generally remain separate and distinct.

Table 1 shows the amounts expended by area gas and electricity boards under six common headings; these figures have been extracted from the accounts of the Gas Council and the British Electricity Authority for 1950-51.

TABLE I

Administrative expenditure	Totals Gas Boards	Totals Electricity Boards
	£	£
Meter reading and collection	2,154,533	1,882,188
Printing and stationery	295,505	1,193,043
Postage and telephones	218,410	959,119
Rent, repairs and maintenance of premises	97,358	1,416,839
Transport, travel and subsistence	157,995	1,022,639
Administrative salaries and wages	1,836,054	11,992,586
	£4,759,855	£18,466,414

The £2.15 mill. and £1.88 mill. expended by the gas and electricity boards refer to administrative expenses incurred in the reading of meters, and in collecting cash from meters. The Association does not exaggerate the potential value of a change over to joint meter reading or collection by itself; as an isolated measure it might give more trouble than it was worth. But, when added to other measures of co-ordination the field for possible total economies 'becomes much too great to be neglected merely for the reason that difficulties will be involved.'

Printing and stationery expenses are primarily concerned with forms, record cards, and other documents in connection with the notification and collection of accounts by the two separate undertakings. The two different account forms frequently go to the same consumer. In most instances the accounting periods coincide, or could be made to coincide. There existed, prior to nationalisation, a long history of joint accountancy, under the auspices of many local authorities, covering simultaneously gas, electricity, and water supplies. The Association suggests that following an extension of joint meter reading scope would be offered for similar joint action in printing and stationery. Similar considerations apply to postage and telephone expenses; rent, repairs, and maintenance; and transport, travel, and subsistence.

Sums expended under 'administrative salaries and wages' relate to the remuneration of members of boards, and to the salaries and wages of staff engaged principally on the functions described in the memorandum. Different methods of accounting may render the two sums incapable of comparison, but it appears that in both cases they exclude the wages of meter readers and collectors. It is suggested that there is scope for economy in these items also, as soon as the principle of co-ordinated administration has been accepted.

The Association suggests that if in each area the gas and electricity undertakings could agree to the pooling in the first instance of certain limited administrative functions such as meter reading and collection and accounts, it might well follow that some joint use of transport, premises, and other services could also be arranged. The staff required to serve such an administrative pool would presumably show a reduction when compared with the numbers at present engaged in these functions in the two separate undertakings.

'From such an arrangement would flow the use of meter and other accounting records in a common form, the co-ordinated dispatch and receipting of accounts, and a reduction in the use of services connected with those functions, all of which should effectively reduce overhead costs.'

Domestic Fuel Supplies

RECENT cold spells have revealed difficulties, particularly in cities and larger towns, in obtaining deliveries of domestic coal, coke, anthracite, and boiler fuel. So far as coal and coke are concerned the main difficulty is distribution rather than supply. The national stock of house coal on January 10 was 1,172,000 tons, compared with 1,107,000 tons at the same date in 1952. Gasworks have plenty of coke; but coal merchants are not able to handle the spate of orders that starts when cold weather occurs.

The Ministry of Fuel and Power says that to some extent customers are responsible for their own homes being unheated. During the summer of 1952 there was a general failure to lay in winter stocks, and the figures for the London region show that 275,000 tons more coal were sold during the summer of 1951 than during last summer.

At most gasworks there are queues of merchants' lorries waiting to be loaded from adequate coke dumps. Anthracite and other boiler fuels is in less plentiful supply, with a general delay of several months in deliveries. The output of Welsh anthracite fields is falling and the sales of appliances for which the fuel is well suited are rapidly increasing. Last year Scotland produced 738,000 tons, opencast mines 473,000 tons, and the South Wales region 2,947,000 tons.

The National Coal Board proposes to sink deep mines in the Swansea area, and the first will be at Gwendraeth, near Neath. The borings have been completed and the sinking operation is to start soon, but the first anthracite is not expected for six years.

Use of coke is officially recommended as an alternative to anthracite and other boiler fuel, but where households are equipped with appliances that burn only anthracite, priority deliveries will continue to be made.

Chemical Engineering Research

PLANS RECENTLY ANNOUNCED for the co-ordination of chemical engineering research activities in Germany with the object of avoiding overlapping and the duplication of effort have materialised with the formation of the 'Arbeitsgemeinschaft chemisches Apparatewesen und Verfahrenstechnik.' This organisation has been formed by agreement between the Dechema, the special section concerned of the Verein deutscher Ingenieur, the Max-Buchner Research Foundation and other interests, and it has the further power to co-opt representatives of any other bodies.

The presidency of the new organisation will alternate yearly between representatives of the Dechema and V.D.I. and the various member organisations have undertaken to lay full details of their plans and progress for discussion by the joint body, of which the first president is Dr. K. Rieb.

News in Brief

The National Coal Board has completed a plan for the modernisation of the Bankfoot Coke Works, Crook, Co. Durham. Under the scheme French coke ovens built in 1882 have been closed, and coke is to be made in Otto ovens which have been rebuilt. Electric loading cars and modern coke-handling equipment have been installed. About 5,500 tons of coal are carbonised weekly at the works.

Gas Consumers in the Sunderland division increased by 1,850 to 110,440 during 1952. A total of 26,000 yards of gas mains were laid, and 10,000 gas appliances, including 4,848 cookers and 3,095 boilers, were installed. During recent cold weather output at the Sunderland gasworks reached the all-time record level of 10,750,000 cu. ft. per day. The Northern Gas Board is to install another 3 mill. cu. ft. water gas plant at Hendon, Sunderland.

Juniors Visit Kodak

IT would be hard to imagine in these times a holiday without snapshots, a town without cinemas, or a newspaper without pictures. Snaps, movies, and Press illustrations are part of the modern way of life and gave zest to a visit of the London and Southern Junior Gas Association to the works of Kodak, Ltd., at Harrow on January 14—the largest photographic factory in the British Empire.

The tour started at the letterpress department, where all labels and leaflets needed for Kodak films, plates, papers, and equipment are printed. The *Kodak Magazine* is also printed here. Then to the camera works where giant presses stamp out metal camera bodies by the hundred thousand. There shutters which split a second into one of those many pre-determined parts are assembled by deft female hands. A completed camera comes off the assembly line every few seconds. A simple 'Brownie' camera contains 136 parts. More advanced cameras have many more.

From the camera works the party was taken to the silver house. Silver is a precious metal indeed where Kodak is concerned, for without it there would be no photography. Silver nitrate crystals are the basic ingredients of photographic light-sensitive emulsions. Next to the Mint, Kodak is the largest consumer of silver in Great Britain—over a ton is used every week at the Kodak works. The making of highly light-sensitive films, plates, and papers has to be done in darkness or in a very dim light. Output of film is reckoned in thousands of miles a week.

Next came the power house, as immaculate as these houses usually are, and the last port of call was the museum, which contains a permanent exhibition illustrating the history of photography and some of its applications.

Mr. W. Johnson, Vice President of the Association, thanked Messrs. Kodak for entertaining them, and Mr. Walker, Education and Training Officer to Kodak, acknowledged.

Daily Output of Gas at Sunderland during a recent cold spell reached an all-time peak of 10¾ mill. cu.ft., an increase of 10% over the previous year. Gas stocks were well maintained at a satisfactory level and gas pressures were good.

The Malta and Mediterranean Gas Company has notified all suppliers that its administration of the gas undertaking in Malta has terminated, and therefore no further materials or services will be required. The Directors propose to convene an extra-ordinary meeting shortly to recommend that the company go into voluntary liquidation.

National Benzole Holdings has been formed by the shareholders of the National Benzole Company as a step in the domestic reorganisation of the capital structure. The National Benzole Company will remain an operating company to carry out the marketing of benzole both in the form of National Benzole Mixture and as a raw material for the chemical industry.

Halifax Coronation Beacon.—A tall beacon pole on the summit of Beacon Hill overlooking the township of Halifax, which was in use to warn the former Elizabethans in those parts of the coming of the Armada, will be in use again at the Coronation of Elizabeth II. At present, divested of brazier or pan, it is useless, but North Eastern Gas Board officials have offered to make a new one, and to fuel and light it. They are willing also to give advice on the lighting of the town's Coronation bonfire. These offers have been accepted by the Halifax Corporation.

Gas Supplies in Glasgow are adequate, stated Mr. D. F. Young, Divisional Controller of the Scottish Gas Board, on January 22, when he answered complaints about lack of pressure. To the suggestion that better supplies would be forthcoming now that tariffs had been increased, he replied that pressure this winter had been adequate. 'Lack of pressure has not been due to shortage of gas at the works, but to chokages in the individual pipes serving houses,' he said. Complaints were investigated and faults rectified as soon as possible. The fact that the price of gas had been increased did not mean that pressure would be improved.

The National Council of Coal Traders, which embraces all wholesale interests of the trade in England and Wales, held a dinner for the first time in its history on January 19 in London, Sir Henry Cooper presided. Replying to a toast proposed by Colonel H. C. Smith, Chairman of the Gas Council, Mr. W. C. Ramsay, Vice-Chairman of the National Council of Traders, said that if the National Coal Board was to succeed in providing an adequate supply of coal of suitable quality for all consumers, then a full marketing scheme, embracing wholesale merchants, must be produced. Sir Hubert Houldsworth replied to the toast of the guests submitted by Brigadier K. Hargreaves.

Six Orders relating to the control of coal and coke supplies, issued during the war, were revoked on January 22. These Orders are the Coal Supply Order, 1942; Fuel Consumption (Information) Order, 1942; Ministry of Fuel and Power (Seizure of Fuel) Order, 1942; Fuel (Inspection) Order, 1943; Legal Proceedings (Local Fuel Overseers) Order, 1942; and the Legal Proceedings (Local Fuel Overseers) Order, 1944.

The Second of a Series of discussions on coal and combustion, led by Dr. A. C. Dunningham, took place at a technical meeting of the Northern Section of the Combustion Engineering Association in the Council Room of the Leeds Chamber of Commerce on January 15. Following the discussion, Mr. A. Higgs, Industrial Engineer of the North Eastern Gas Board, addressed the meeting on 'Practical points in obtaining fuel economy with gas fired plant.'

A Real Welsh Meal

A TRADITIONALLY Welsh meal, cooked and served by their own home service advisers, was the feature of a luncheon given recently by the Wales Gas Board to Sir David Maxwell Fyfe, Home Secretary, and Minister for Welsh Affairs. It was held so that he could meet members of the executive committee of the Welsh Tourist and Holidays Board. Mr. T. Mervyn Jones, Chairman of the Wales Gas Board, and an executive committee member of the Tourist Board, presided.

The menu at the luncheon, held in the board room of the Cardiff undertaking, was: cockles, soused herring, leek broth, boiled ham and parsley sauce, mashed potatoes, carrots and little onions, Welsh rarebit, Aberffraw cakes, Welsh cakes and tea.

Welcoming Sir David, Mr. Mervyn Jones said the family fare was such as might be served in any Welsh cottage, not to say hotel, today.

The cooking was supervised by Mrs. M. B. Gould, canteen superintendent of the Cardiff undertaking, and Miss E. G. Rehbein, senior home service adviser at Cardiff. During the luncheon a recital of harp music was given by Ann O'R. Llwyni (Miss Ann Griffiths of Maesteg), who is only 17 years of age, and is the youngest member of the Corsedd of Bards of Wales.

Since the luncheon a number of requests have been received from organisations and hoteliers in Wales for copies of the all-Welsh menu, which they wish to use for entertaining visitors to Wales, and it is anticipated there will be requests also from outside Wales. Accordingly the Wales Gas Board is having a leaflet printed embodying the menu, together with a list of the names and addresses of harpists who will be available for banquets and functions. These leaflets can be obtained from the Wales Gas Board, or from the Welsh Tourist and Holidays Board, which has agreed to make them available to hoteliers or societies in any part of Britain.

Tenants' Freedom of Choice

Consultative Council 'Beginning to Waver'

QUESTIONS were again raised at a meeting of the Eastern Gas Consultative Council at the Connaught Rooms, London, on January 19, presided over by Alderman R. Turner, about the prepayment supplementary charges to users of old black cookers. Already, on representations from the Council, the Eastern Gas Board had confined the 2d. per therm supplement to the first 30 therms consumed per quarter, representing a maximum of 5s. per quarter for the heaviest consumers, but as many of the appliances were 'old, obsolete, and wasteful' and their users had more than paid for them over long periods of years, some members thought there was a case for further concessions. One member thought 1d. instead of 2d. should be adopted as an interim step. The Chairman said the Board had pointed out that it would take five years to replace all obsolete cookers. Consideration would be given to the charges at the next revision of gas tariffs.

Another problem was the burden of the cost of supplying gas to new towns, particularly heavy in the case of the Eastern area, with no fewer than five new towns. Mention was made of the case of Crawley, in which instance the South Eastern Gas Board had failed to persuade the Government departments concerned to grant financial aid during the development period in which gas sales would not be sufficient to meet capital charges. A resolution was passed, however, urging the Eastern Board to press for financial assistance.

Declining Sales

At previous meetings the Council had expressed concern at a decline in gas sales. Figures were now furnished by the Board comparing gas sales to various classes of consumers for the half years ended September 30, 1951, and 1952. Domestic consumption showed a decrease of 5% (6.88% on ordinary and 3.91% on prepayment); industrial decreased by 0.94%; commercial by 0.47%; and public administration by 7.6%; showing an overall decrease of 3.7%.

Alderman Turner told the Council that he had been informed by the Board on January 15 that the decrease had now been overtaken, the total increase to date since April 1, 1952, having reached 1.6% over an identical period last year.

An effort is to be made to secure corresponding figures for electricity, to see to what extent, if any, the Gas Board has lost business to the Electricity Board.

A good deal was said about the importance of keeping consumers informed of the activities of the Consultative Council, and it was agreed that copies of the third annual report (reprinted separately from the Board's report) should be distributed wherever they were likely to be read. A Bishops Stortford member thought more might be done in the direction of Press publicity, to which the Chairman replied that on the whole the Council had a fairly good Press. Short reports were issued as soon after the meeting as possible, to every newspaper published in the area, whether its representative attended the meeting or not.

The Watford Divisional Committee reported that the Baldock gasworks had ceased to manufacture gas, the local office had been closed, and all sales and service enquiries, accounts and coke orders were now conducted through the Board's showroom at Letchworth. The price of gas at Baldock had also been reduced to the Letchworth level of 20.5d. per therm.

The Chairman presented a memorandum on the question of freedom of choice in which he said that in view of national conditions—the high cost of building, the cost of wiring for electricity, the cost of running a gas supply, shortage of cast iron and steel—the Council was beginning to waver where once it was firmly resolved that freedom of choice should be given to all tenants of new housing estates. If the electricity boards were adamant in pushing electricity for cooking and heating, resulting in only a percentage of the houses on any new estate taking a gas supply, the Council would like to be assured that the laying of mains and service pipes and the carcassing of such houses as elected to take gas would not become a charge on consumers as a whole. In other words it was inclining to the view that where it was not a paying proposition to extend mains the estate should be left to the Electricity Board.

It would appear, said Alderman Turner, that electricity boards were not interested in any new housing estates unless they were assured that a good proportion of the tenants would decide to use electricity for cooking, heating, etc., for which at present they were prepared to supply electricity at prices below average cost. The Gas Board required that a sufficient number of tenants would choose gas for cooking and heating before it embarked on the extension of gas supplies to new housing estates.

How could the matter be disposed of, and what were the alternatives? If the charge for electricity were raised to an economic figure for domestic cooking and heating it might have the desired effect and result in gas being generally used for those purposes. That would be the logical way of restricting the use of electricity for purposes for which in the national economy it was known that gas would be better, and enable the electricity boards to conserve their energy thereby avoiding future load shedding and large expansion of generating plant and, what was perhaps even more important, a more economic use of the nation's coal.

If both gas and electricity continued their present policy of competing for the business of cooking and heating on new housing estates, at what point would one give way to the other? Would the Minister of Fuel and Power stand by and watch the extension of electricity supply in the event of the gas board deciding that it was no longer a paying proposition to install a gas supply on future housing estates?

Emergency Cooking

TWENTI-FIVE HOME SERVICE ADVISERS representing all the North Western Gas Board's 17 groups, put away the trim white overalls in which they normally work and went to Manchester on January 15 clad in oldest tweeds, duffle coats, and gum boots to practise bricklaying.

They were attending a demonstration given by members of the Women's Voluntary Service of cooking for large numbers on improvised equipment in an emergency, held at the Gaythorn gasworks and organised by the Board's Civil Defence Officer, Lieut.-Col. W. H. Slack, in co-operation with the W.V.S. (represented by Mrs. Christian-Fletcher of the Regional Staff) and the Ministry of Food.

Under the direction of Mrs. Massey, a W.V.S. demonstrator, the home service girls quickly got down to the job of building two ovens out of bricks and mortar. Within an hour, a 'dust bin' brick oven and a 'boiling plate' were complete and ready for lighting.

Armed with this 'know-how,' the 25 home service advisers returned to their groups ready to train and advise W.V.S. helpers and other civil defence workers in their districts in the art of building and operating these improvised cookers for emergency feeding purposes.

In Parliament

A Peaceful World

A PLEASANT little tribute was paid to the gas industry in Wales in the course of the debate on Welsh affairs in the Commons on January 22, albeit the compliment was only by contrast with electricity.

Mr. RAYMOND GOWER (Barry) was referring to the question of fuel and power and observed that there was a noticeable difference between gas and electricity. The world of the Wales Gas Board, he said, seemed to be one of peace, while that of the South Wales Electricity Board was not nearly so peaceful. He suggested that the organisation of the Wales Gas Board as a single unit might be particularly fortunate; but in regard to the Electricity Board in South Wales there had been an error of judgment of tactics. Mr. Gower strongly criticised the basis of charge and the use of room space as a criterion. It appeared likely to encourage waste rather than thrift. In Wales, as in other parts of Britain, the policy of the Board seemed peculiarly adjusted to national needs, when they saw lavish advertising of electrical equipment at a time when economy in the use of electricity was still enjoined upon them.

Wales Gas Board's Story of Progress

THE *Western Mail* on January 19, published a free 40 pp. Commercial and Industrial Review supplement recording changes which have taken place since the beginning of the last war and indicating present trends and future developments. Two pages were devoted to an article by Mr. T. Mervyn Jones on the Wales Gas Board's story of progress, and the displayed advertisements included a half page on the theme of Mr. Therm the nation's cook, in general engineering, and in heating and ventilating.

After recalling that one of the earliest discoverers of coal gas (in 1767) was the Right Rev. Richard Watson, Bishop of Llandaff, Mr. Mervyn Jones stated that more than 100 gas undertakings were established in Wales in the 19th century, and the first foundation of the South Wales grid was laid in 1907, when the Rhymney and Aber Company agreed to take and develop the utilisation of surplus gas from the Powell Duffryn Colliery Company's coke ovens at Bargoed.

Since nationalisation the South Wales grid has developed to the extent of 162 miles of trunk main, and at present there is being sold in the South Wales industrial belt some 81% of the total gas sold in Wales; of the gas so sold more than 70% comes from the steel industry, the National Coal Board, and privately owned coke ovens. In North Wales the new Maelor (Wrexham) works will shortly be producing gas to a grid which may ultimately extend along the coast to Anglesey. A smaller but potentially valuable grid is being planned in Pembrokeshire based on Pembroke Dock and extending to Tenby, Milford Haven, Neyland, and Haverfordwest.

Addressed mainly to the industrial reader, the article indicates how the Wales Gas Board is paying particular attention to the use of gas in light and heavy industry, especially in the development areas.

More Gas for Industry

Industry in Wales is now using more gas than ever before. In the districts served by the Newport undertaking, industrial gas consumption is 48 times what it was in 1938. Similarly, striking increases are to be found in other industrial centres and on the trading estates. No less striking has been the variety of industrial processes now carried on in Wales where gas is used as a source of heat. They range from nylon spinning, aluminium rolling and extrusion (the greater part of the structure of the Comet and most modern jet fighters were fabricated with Wales gas) through electric lamp manufacture to electric motor and control gear, motor-car accessories, all types of springs, cycle manufacture, laboratory glassware, optical lenses, vacuum flasks, vacuum cleaners, steel furniture, jewellery, clothing, textiles, ceramics, galvanising, chemical works, and the many incidental heat demands of manufacturing processes such as are required in constructional steelwork, etc.

In the smaller rural market towns there are large numbers of important, if small, industrial consumers, for the market towns of Wales contain a number of long-established and some most modern industries. In a small mid-Wales town gas is now supplied to an old-established firm for all heat treatment processes. The products of this firm—mining machinery presses and stamping machines—are exported to all parts of the world. Again in another mid-Wales town gas is supplied to a modern factory for heat treatment and drying processes in connection with the manufacture of cycles, an item of great value in the export market. In a small town in west Wales gas is supplied to a modern factory for the many heat processes required in the manufacture of optical lenses. In this case the gasworks had to be completely rebuilt, and now the industrial load is double the output of the old works.

Referring to the butane/air plant at Whitland, Mr. Mervyn Jones says technically, the experiment has been a great success. The Whitland experiment, which is now being visited by engineers from the countries of Western Europe and even from America, offers the prospect of developing in market towns in Wales light industries that call for extreme accuracy in heat control.

Even the liquor effluent from gasworks has proved to be a valuable asset as a land fertiliser. Experiments have been proceeding within the last year, in collaboration with the National Agricultural Advisory Service of the Ministry of Agriculture at Trawscoed, near Aberystwyth, which have clearly established the value of liquor effluent as a fertiliser on grass and arable land. With their experience as a guide, farmers and gardeners in Wales can be further assisted in their work of increasing food production by this additional activity of the gas industry.

'A Bad Case of Ignored Complaint'

AN overhaul of the Scottish Gas Board's service department is to be suggested by the Scottish Gas Consultative Council following discussions in Edinburgh on January 7 of 'a bad case of ignored complaint.'

The complainer was Provost R. Gordon Johnston, of Tillicoultry, whose geyser was first reported faulty on November 7, and had not yet been repaired. When the defect was first notified on November 7, nothing was done, said Mr. T. A. Morrison (Chairman of the Council). On November 10 the matter was again reported, and again no action was taken. On November 17 the defect was reported for the third time, and some days later workmen appeared at the Provost's home and the geyser was taken away.

This was a 'perfectly scandalous' situation in itself, said Mr. Morrison, but it was not the whole story. The geyser lay at Alloa a week before being sent to the works. By December 15 it had not been returned: the Provost reported the matter to the local consultative committee and the delay was referred to the manager. Later a temporary geyser was installed, but the original had not yet been returned.

'This is a bad case,' said Mr. Morrison, 'and I am not suggesting that this sort of thing is happening in every district. Complaints are generally dealt with within two or three days at most. There is no excuse in a case like this. I suggest that we call the attention of the Board very strongly to it and impress upon them that the service department should be overhauled to ensure that complaints of this kind are promptly dealt with.'

The local representative of the area gas consultative committee was the Provost himself—a fact which, according to the Chairman, made the position all the worse. When a member protested that consultative council or committee members should not expect to get special privileges, Mr. Morrison replied that special privileges were certainly not given in this instance.

Referring to a report of low gas pressure in Leven, Mr. Morrison said that although the matter had not been referred to the council he had made special enquiries. The position was that gas consumption in Leven had been increasing fairly rapidly. The Board had made provision to meet it, first by additional production plant and, secondly, by increasing holder capacity. Both these were in progress, but there had been delay owing to the steel shortage. Leven authorities had been asked whether they preferred priority to be given to the plant or the holder, and had said they would have the production plant. The holder would follow in due course.

It was intimated that the Scottish Gas Board had approved a project for the provision of bulk supply from Edinburgh to Dalkeith, Newtongrange, and Arniston at an amended cost of £116,100, compared with the previous estimate of £88,625. The scheme is being undertaken to the extent of 5% during the current year, 15% during 1954-55, and 60% and 20% during the following two years.

The Industrial Disputes Tribunal has awarded a wage increase to about 120,000 workers in the heavy chemical and allied industries. The award gives an extra 1d. an hour to men and ½d. to women with proportionate increases for juveniles. It operates from the first full pay period following January 13. For men the award represents a weekly increase of 3s. 8d.

Sulphate of Ammonia Trends

Decline in Home Agricultural Consumption

THE 32nd annual report of the British Sulphate of Ammonia Federation, covering the year ended June 30, 1952—the 55th year of propaganda work undertaken successively by the Sulphate of Ammonia Committee, the Association, the Federation, Nitram, Ltd., and Imperial Chemical Industries, Ltd.—records an increase of about 10% in the estimated world output of nitrogen, due mainly to the coming into operation of new plants. The demand for industrial forms increased by 13½%. A rise of about 7½% in agricultural consumption was not sufficient to absorb the total supply available, and working stocks at the end of the year showed some increase. Figures given in Table 1, expressed in thousands of metric tons of pure nitrogen for 'fertiliser years' ended June 30, are compiled from published information available regarding production and consumption of nitrogen. The figures for 1950-51, given 12 months ago, have been revised.

TABLE 1
WORLD PRODUCTION AND CONSUMPTION OF FIXED NITROGEN FOR ALL PURPOSES
(In thousands of metric tons)

	1951/52		1950/51		1949/50	
	Production	Consumption	Production	Consumption	Production	Consumption
EUROPE (*a*)	3043.3	2587.9	2707.9	2449.7	2436.7	2213.0
Belgium/Luxemburg ..	229.0	84.7	180.9	84.5	182.9	84.9
France	294.9	270.9	273.8	290.4	234.3	250.3
Germany—W. Zones ..	613.2	417.6	516.9	400.7	497.4	368.4
Netherlands	227.0	167.9	189.1	169.4	113.6	146.2
Norway	172.0	40.2	173.0	36.9	153.0	42.1
Italy	215.0	186.0	177.6	170.0	137.0	138.6
U.K.	413.1	303.4	382.4	295.0	361.8	276.4
Other Europe (*a*) ..	879.1	1117.2	814.2	1002.8	756.7	906.1
ASIA (*b*)	521.7	732.3	482.4	683.2	470.5	745.6
China and Formosa ..	22.5	112.7	15.1	84.9	10.4	66.1
India and Pakistan ..	24.9	81.0	9.7	75.9	11.3	73.6
Ceylon	—	14.3	—	13.3	—	12.3
Japan proper	471.7	436.9	455.0	435.6	386.4	442.5
Other Asia (*b*)	2.6	87.4	2.6	73.5	62.4	151.1
AFRICA	27.3	180.6	19.4	177.7	18.6	149.7
Egypt	9.1	108.5	0.7	115.6	0.2	96.4
Other Africa	18.2	72.1	18.7	62.1	18.4	53.3
OCEANIA	15.9	26.7	13.5	28.1	11.9	22.8
AMERICA	1892.6	1844.4	1774.8	1620.5	1791.5	1323.0
U.S.A. (*c*)	1465.0	1667.6	1321.7	1457.2	1328.0	1201.9
Canada	181.0	59.0	182.2	50.6	190.0	44.6
Chile	236.1	14.2	265.7	12.1	270.9	14.3
Br. West Indies ..	—	10.4	—	7.6	—	7.3
Other American ..	10.5	93.2	5.2	93.0	2.6	54.9
TOTAL WORLD ..	5500.8	5371.9	4988.0	4959.2	4729.2	4454.1

(*a*) Including Eastern Zone of Germany and U.S.S.R. (*b*) Including North Korea and Manchuria. (*c*) Including Hawaii and Puerto Rico.

Regarding home production and consumption of fixed nitrogen, the report states that the total United Kingdom production of nitrogen products in the calendar year 1951 was 5.7% higher than in 1950. Output of fertiliser products increased by 0.5% and industrial forms by 19%.

The quantities in the first tonnage column of Table 2 show the total production of nitrogen products expressed in terms of a standard material containing 25% ammonia = 20.6% nitrogen. The last column shows tons of sulphate of ammonia actually produced with a nitrogen content varying from 20.4 to 21.1% N.

The figures in Table 3 are based on nitrogen producers' deliveries against sales within the fertiliser year, and for 1951-52 show a decrease of over 30,000 tons nitrogen, mostly in the form of sulphate of ammonia, compared with the previous season. This figure appears to confirm the estimate in last year's report regarding the probable carry-over to 1951-52. Actual usage during each of the last three fertiliser years was probably between 205,000 and 210,000 metric tons nitrogen.

The 1951-52 fertiliser year was a period of transition and political events affected agricultural production. The steadily rising curve of production and fertiliser usage from 1947 to 1950 resulted from the agricultural expansion policy of the Government which relied on guaranteed markets and subsidised requisites, such as fertilisers and feeding-stuffs. The targets set in 1947 had largely been achieved by 1951, but no new programme was ready to stimulate further expansion. Indeed some 'disincentives' were applied in the 1951 price review to products such as milk and eggs because production had reached the levels set. The policy of subsidy withdrawal from fertiliser prices was completed by July 1, 1951, and stocks held by farmers and merchants on that date were high. It was expected that even in a normal agricultural year the liquidation of stocks would adversely affect sales of fertilisers. In fact the drop in sales in 1951-52 was greater than had been expected.

Agriculturally, the season 1951-52 was not unfavourable. Spring crops were looking well and the early potato crop in particular was heavy. Much of the 650,000 acres ploughed in the spring of 1952 under the Government subsidy scheme was cropped with barley. The grassland campaign sponsored by the Government was actively supported by I.C.I., Ltd., who had organised a full

TABLE 2
PRODUCTION OF NITROGEN PRODUCTS AND SULPHATE OF AMMONIA IN UNITED KINGDOM
(Long tons of 2,240 lb.)

Calendar Year	Total	Included in the Total	
		Industrial Ammonia Products	Sulphate of Ammonia as such
1939 ..	856,800	263,900	483,300
1948 ..	1,648,800	355,100	901,000
1949 ..	1,691,100	358,800	924,500
1950 ..	1,803,400	505,000	960,700
1951 ..	1,906,300	601,500	968,100

TABLE 3
DELIVERIES FOR AGRICULTURAL CONSUMPTION IN THE UNITED KINGDOM

Fertiliser Year	SULPHATE OF AMMONIA ONLY Long tons of 2,240 lb. Total	ALL NITROGEN FERTILISERS (Metric tons of 2,204.6 lb.) NITROGEN CONTENT IN		
		Sulphate of Ammonia	Other Forms	Total Nitrogen
1923/24 ..	128,000	26,800	7,600	34,400
1930/31 ..	142,400	29,800	10,400	40,200
1938/39 ..	179,800	37,600	23,000	60,600
1944/45 ..	612,381	128,169	44,305	172,474
1945/46 ..	552,202	115,574	48,889	164,463
1946/47 ..	551,208	115,366	48,700	164,066
1947/48 ..	632,916	132,467	52,943	185,410
1948/49 ..	593,779	124,276	60,828	185,104
1949/50 ..	748,115	156,577	69,083	225,660
1950/51 ..	704,950	147,543	68,384	215,927
1951/52 ..	547,607	114,612	67,382	181,994

programme of farm demonstrations for the summer season. Two of these were held with great success in Northern Ireland and Devon respectively, but the rest had to be cancelled owing to foot-and-mouth disease restrictions which also prevented the showing of cattle at all the principal agricultural shows during the summer and hampered the activities of I.C.I. technical representatives in their visits to farms.

Total shipments of sulphate of ammonia from the United Kingdom during 1951-52 exceeded 348,000 tons—the highest figure since 1931-32—and showed an increase of 45% on 1950-51. The allocation to overseas markets was controlled by the Government departments concerned. When it became apparent in the early spring that ample provision has been made for the home market, allocations to Commonwealth markets were increased and towards the end of the season large shipments were made to the Far East.

Major purchasers of British sulphate of ammonia during the year were: British West Indies, 41,988 tons; India, Pakistan and Burma, 35,904 tons; China and Hong Kong, 34,934 tons; Ceylon, 33,999 tons; Malaya and British Borneo, 27,463 tons; Australia, 24,000 tons.

TWO FURTHER PRICE INCREASES

Scotland . . . .

THE Scottish Gas Board has announced a rise in the price of gas by 1½d. a therm or, where gas is sold on a volumetric basis, by 6d. per 1,000 cu. ft. For nearly all consumers the new rates will not come into effect before April 1. While most consumers will be subject to the increase, some 19 places in Scotland will actually pay less for their gas, for the Board has decided to reduce its top price from 10s. per 1,000 cu. ft. to 9s., and 9s. 4d. for prepayment collection. In 40 other places, where gas charges are at present near the selling price, consumers will pay increases which are less than the general increase for the rest of the country.

Sir Andrew Clow, Chairman of the Board, said in Edinburgh on January 16 that for the average consumer the increase would mean about 3d. a week on the gas bill. The last increase was made a year ago when the price of gas was raised by 1d. a therm. The first reason for the present price rise was an increase in certain charges. Wages and salaries were recently revised, involving an extra cost of rather over £230,000 a year. In the present situation the Board had to purchase substantial quantities of English coal, and the transport of these supplies was costing about £8,000 a week more than the transport of the same amount of Scottish coal would involve. Transport charges had recently been raised, involving for other supplies an additional cost of about £45,000 a year, principally on account of Scottish coal.

Building Up a Reserve

The Board had been replacing obsolete plant at much more than its original cost, and had been enlarging and re-equipping other assets. These processes, which must continue, had involved large capital costs, which had necessitated greater charges for depreciation. The latter charges were rising at present by about £100,000 a year. In addition, the Board was obliged to maintain a general reserve. Owing to the fact that there had never been a surplus available, the Board had not yet been able to fulfil this obligation, and considered that it should from next year aim at providing a sum near £100,000 per annum until an appropriate reserve had been accumulated.

There were also existing deficiencies to be met. Income was at present less than expenditure, and so far as an estimate could be framed, the Board expected a deficit in this year of between £200,000 and £300,000. To this had been added the accumulated loss carried over from 1951-52 of £94,407. Nowhere would the increase be applicable to any gas already consumed, nor would it be made on any gas consumed before the meters were next read after the formal announcement. This meant that from nearly all consumers the Board would receive no extra payment in the financial year 1952-53—*i.e.*, before April 1 next.

But in 1953-54 it was hoped to secure about £1,200,000 from the present changes in prices. This should provide for the requirements mentioned; and it might provide a little scope for possible concessions. The Board had hitherto felt obliged to maintain generally the very varying tariff schemes which it inherited, and it considered that it should be possible to evolve a system which would be more consistently equitable. This could not be put into operation without an alteration of charges, and the Board was anxious that alterations should, as far as possible, avoid further increases.

The total cost of 'ceiling price' concessions would be about £125,000—an additional £25,000 a year, since present concessions cost about £100,000 a year.

Asked about the import of English coal, Sir Andrew said that the figure of £8,000 a week he had given did not represent an increase of £8,000 a week compared with the previous year, for some English coal had been brought in then. Owing to the coal position in Scotland, however, they were now getting much larger quantities of coal from England—at the moment, about 7,000 tons a week, the most they had ever had. He was unable to say whether the position would improve. The Board's coal stocks, he said, were 'lower than comfortable for this time of year.'

. . . . and the North West

AFTER conferences with the North Western Gas Consultative Council and its district committees, the North Western Gas Board announces that an immediate increase in gas prices is unavoidable owing to heavy increases in costs. During the next financial year increased costs of labour, materials, equipment, and capital charges will amount to £1,840,000, and the Board states that it is necessary to raise £1,536,000 additional revenue to balance the accounts and provide a progressive contribution to the accumulated deficit.

The price for domestic gas up to 65 therms a quarter will be increased by 1½d. per therm in 12 out of 17 group districts. In five group districts where current prices are below the standard tariff (Blackburn, Burnley, Oldham/Rochdale and Preston groups and the Macclesfield-Bollington district of the North Cheshire group) the increase will be 1¾d. per therm.

Under current tariffs the highest price charged varies from 16d. per therm to 20d. per therm. Under the new tariffs the highest price will range from 17¾d. to 21¼d. per therm. For 96% of the gas consumed the highest price will range between 17¾d. and 18¼d. per therm.

No change is to be made in metering charges nor in the standing charge in two-part tariffs where these exist. In the sub-standard price groups the commodity charge in the two-part tariffs will be increased by 1¾d. per therm; in all other groups by 1¼d. per therm.

A change advantageous to consumers is being made in the method of charging for the hire of old-type cast iron cookers. At present there is a supplemental charge of 1½d. per therm for such hire so that the amount payable quarterly varies with the amount of gas used. Under the new system consumers will have the option of continuing to pay this supplemental charge or of paying a fixed quarterly charge of up to 3s. 3d.

The new prices for gas do not include provision for any advances which may take place in the cost of coal. The Board states that if the price of coal should be increased the extra cost must be recovered separately and equally from all consumers by a flat increase on every therm of gas sold at the rate of ¼d. per therm for each 1s. 6d. per ton increase in the price of coal.

The Board's proposals were criticised at a meeting of the North West Gas Consultative Council on January 20. The Council passed a resolution admitting the necessity for some increase in revenue, but considered the tariff proposals to be 'unduly high' in their effects upon the small consumer. It recommended that the impact of the increases be lessened by writing off the accumulated deficit over a period longer than that envisaged in the report.

Sampling and Quality Control

Discussion on paper by E. H. M. BADGER, B.A., M.Inst.Gas E., F.R.I.C., London Research Station, Gas Council.

MR. H. M. SPIERS (Woodall-Duckham Co.) said that industry was becoming more conscious of the benefits to be gained from the application of statistical methods to quality control and the scientist made much use of these methods in planning his experiments so as to obtain the maximum amount of information with a minimum expenditure of time and effort.

Much of Mr. Badger's paper had dealt with the theory of sampling. His section on coal was a very useful one and summarised recent co-operative work of a very comprehensive nature in which he participated. Unfortunately a relationship between the variance of single increments and the weight of the increment could not be established. However, the work did lead to a suggestion for a new method of sampling (duplicate sampling) which seemed to offer attractive possibilities for the quality control of consignments and to afford a useful guide as to the suitability and adequacy of the sampling procedure adopted.

Firebricks presented many difficulties both to the manufacturer and to the tester. Mr. Badger had described a co-operative test carried out by his Gas Board and the Woodall-Duckham Company to investigate the variance between bricks, within bricks, and between measurements made by different observers. It was very gratifying that his statistical analysis of the results showed an excellent degree of concordance between the two laboratories.

The manufacturer of silica brick had a much easier task than had the manufacturer of firebricks, and the task of the testing laboratory was also easier since the true specific gravity of the product afforded an indication of the efficiency of the kiln firing. Mr. Badger had gone very fully into the question of the quality control of silica bricks and had put forward a specification and a sampling scheme which warranted serious consideration.

It seemed rather an over-simplification to assume that the proportion of quartz was linearly proportional to the density since, for a given density, the quartz content depended on the relative proportions of cristobalite, tridymite, and glass. For a given density and glass content, a brick with a high cristobalite content would contain less quartz than would a brick with a high tridymite content.

More Justifiable Assumption

It might, however, be a more justifiable assumption that, for a particular make of brick, this linear relationship applied. In a similar way, the relation between the percentage linear contraction and the density of a silica brick depended on the source and nature of the brick. This rendered it a little difficult to draw up a specific gravity specification which would cover both types of brick adequately because, if too high a specific gravity limit was fixed, tridymite bricks with an excessive quartz content would not be excluded whereas, if the limit was set too low, cristobalitic bricks with a low quartz content would be excluded.

What they had required of silica bricks was a low specific gravity to ensure that the permanent expansion of the setting would not be excessive and a low quartz content to minimise the effect of temperature fluctuations about the quartz inversion point. From the design aspect it was, of course, possible to provide for different degrees of expansion, but matters were simplified if a uniformly low value was the rule. They had, therefore, endeavoured to limit the makers to a nominal maximum true specific gravity of 2.35, and some of them had come very near to achieving this, apart from occasional lapses.

Mr. Badger referred to a consignment of bricks with a mean specific gravity of 2.360 and a standard deviation of 0.005, and stated that it would be reasonable to accept it. However, such a consignment would contain 5% of material with a specific gravity between 2.35 and 2.37 and that was the type of material they had always tried to rule out. He thought, moreover, that so low a standard deviation with so high a mean specific gravity was exceptional.

The author had put forward a scheme whereby it was possible to ensure that consignments containing more than 10% of material with a true specific gravity in excess of 2.375d. be rejected 19 times out of 20. He had based the scheme on the assumption that the value of 0.6% (including the tolerance of 0.1%) for P.L.C. at 1,450°C. mentioned in the I.G.E. specification of 1946 corresponded to a mean true specific gravity of 2.362 and to the presence of 10% of material with a specific gravity in excess of 2.375 if the standard deviation was 0.01.

A Safeguard

What was wanted of a sampling scheme was that it should ensure that consignments containing less than 2% of bad material should be accepted 19 times out of 20 and that consignments containing more than 10% of bad material should be rejected 19 times out of 20. With an intermediate percentage of such material, one out of two consignments would be rejected. Such a plan provided a safeguard to both the maker and the user, and the average quality of consignments must be very good if the maker wished to avoid the risk of having a large proportion of his consignments rejected. Mr. Badger's scheme did, in fact, achieve this desideratum. According to the basis he advocated, consignments with a mean specific gravity of 2.337, a standard deviation of 0.018 and, therefore, a 2% content of material with a specific gravity in excess of 2.375 would be rejected only once in 20 through a value in excess of 2.345 basis obtained for a composite of 20 specimens. This seemed satisfactory and it might be concluded that, if the dividing line had been correctly located, the proposed scheme met the needs of the case. However, when consignments were small and numerous, an enormous number of pieces would have to be taken. A scheme of a similar nature, applicable to steelworks silica bricks from a particular source, was described in 1947 by W. T. Hale in a paper 'A statistical sampling plan for refractory products with special reference to silica bricks,' presented to the Refractories Association of Great Britain, and it was very useful that they now had proposals for a scheme applicable to silica bricks for the carbonising industries. Mr. Badger went further than did Hale because he took standard deviation more fully into account.

The author suggested that the limiting value 2.345 for the specific gravity of a composite sample of 20 pieces on the basis of a standard deviation of 0.018 might be increased if the standard deviation was known to be lower. This was a useful provision for bricks with a high cristobalite content though, to ensure a safeguard against an excessive quartz content, it would have to be applied with caution to bricks which had a high tridymite content.

Under the scheme, makers who worked to a low mean specific gravity and to a reasonably low standard deviation would readily satisfy requirements. The golden rule for the manufacturer was 'employ quality control,' and some makers were already doing so.

On the question of when to use 2.345 as the criterion, he would suggest that more information would be gained if the figure were based not on a composite sample but on the mean

result of tests (all reported) on the 20 individual samples, as an estimate of the standard deviation would then be gained.

Apart from the question of consignments, there was the question of deliveries over a period. When hundreds of samples of individual makes of bricks were tested each year, the consumer obtained a very good idea of the properties of the material and he was quickly able to detect any changes which might occur as a result of an occasional slip-up in the manufacturing process or of a change in the source or nature of the raw materials. However, by the time the defect came to the notice of the consumer, the manufacturer might well have overcome the cause.

A good specification should imply 'If you follow me you will undoubtedly be safe, but if you depart from me you will certainly run into trouble.' The specification must, therefore, be drawn up in such a way that it would embrace all brands of bricks which had proved of good service in the past subject, of course, to the maintenance of their established characteristics and quality. The author seemed to have drawn up his scheme on as sound a basis as could be desired, but time alone could show whether his dividing line between good and bad had been correctly located.

Not of Academic Interest

Mr. Tomlinson (Scientific Department of the National Coal Board) commented that the sampling of coal was certainly not a matter of academic interest, as they had found recently when they published their price structure. The fundamental thing concerned with coal science was the sampling. Often they found that the people in a laboratory were trying to do ash determination to an accuracy of 1.0% or 2.0%, or doing calorific values and hoping to get them within 30 B.Th.U., when the sampling accuracy might be 1% of ash or worse, and they were lucky if the calorific value was within 150 B.Th.U. The errors arising in sampling were insufficiently realised. Although in most cases the rigid application of the existing B.S. specification would provide the accuracy required, nevertheless the experience in very many plants appeared to be that it was very difficult to carry out that specification rigidly.

Before one could devise a satisfactory sampling scheme, whether for coal sampling or for any other application of sampling, it was first of all essential to be quite clear as to what the work was carried out for. It was not sufficient to say 'We just want a figure at the end of the month.' It was obvious that they must have an accuracy attached to that figure. The results at the end of the month might be based on a large number of samples, and it was necessary to know how accurate each of those samples must be. It was not their practice in the coal industry, for purely practical reasons, to take a sample from every lot of coal which was produced at the coal preparation plant. Neither was it possible to do the same in many big receiving industries. Therefore, their biggest error in such circumstances had nothing at all to do with the sampling of the coal; it was due to the fact that they did not sample some of the coal.

Because of that fundamental error which arose in the work, there was often little point in sampling to a very high accuracy, and the figure of 1% even was not very realistic. In some work they had done recently within the Board, they had sampled two coals. One was a clean coal, and they found they were sampling—using duplicate sampling to measure it—to within 0.6% of ash content. In another case they found they were sampling to within 1.6% of ash content. But in both cases they found that their quarterly figures were being affected by less than 10% by sampling errors. Therefore, while one coal was more variable than the other, both were being sampled equally satisfactorily.

It was apparent that any sampling scheme must be based on a thorough understanding of all the errors which were involved and of the purpose for which the work was being carried out. When they knew the errors and the purpose, then it was possible to design a satisfactory sampling scheme, and that entailed that they should measure as much as they could, and, where they could not measure, they must ensure that the accuracy of the process was sufficiently good not to affect it. This meant that they must eliminate any form of bias in their sampling. It also meant that things like production errors must be kept low.

In the Coal Board they were conscious of this problem and had been active supporters of the B.S. Committee. They were finding that it was a very much more complicated problem than people realised at first. Above all, perhaps, the greatest difficulty about obtaining satisfactory sampling lay not in the sampling scheme and not in the understanding, but in the plant which was available. All too often coal preparation plants and coking plants seemed to have been built almost with the specific purpose in mind of making sampling difficult. It was essential—because the quality of what they were producing would be improved—that sampling positions should be built into the plant they were using. They would never reach a satisfactory situation until it was possible to take satisfactory samples in all cases.

Mr. John Foxton (South Western Gas Board) remarked that B.S. No. 1017 stated that it was essential that sampling should be carried out by a trained sampler, and recommended methods of sampling were outlined. How many works provided a trained man for this task, one who could be trusted to submit truly representative samples to the laboratory? One might also ask how many works had adequate facilities for the taking of coal samples. This point seldom appeared to have been considered. Often the only suitable point for sampling was inaccessible, and sometimes there was an element of danger in collecting samples from these places. More than 20 years had passed since British Standard specifications for coal sampling were first published, and yet new plant was being installed where any sampling scheme had to be one of improvisation.

In regard to the general attitude towards sampling, it was doubtful if a large majority of those who required samples to be taken appreciated the amount of work involved in the collection of a true sample. Mr. Badger's paper served to emphasise that sampling was a science, and that, in accepting this fact, the specifications should be followed precisely. No results obtained were worth consideration unless this was the case. All samples submitted for examination should be guaranteed to have been taken in accordance with the specifications.

What were the possibilities of sampling for quality control at a works receiving, say, 50 trucks of perhaps four different coals daily? Could the cost of sampling be justified? If an individual truck of coal was considered as one increment, to what figure could the ash content of an individual truck be raised before a complaint of quality would be justified, bearing in mind that for every truck of poor coal, there was likely to be a fairly large number of trucks of average quality coal? Since sampling for quality control was a scientific process, and assuming that it was carried out by a team of trained personnel without bias, why should money be wasted by repeated sampling? Would it not be possible to accept the National Coal Board's results? The gas boards could have observers who would visit N.C.B. areas and satisfy themselves that the arrangements were satisfactory. This would avoid much unnecessary effort.

Inevitable Compromise

Mr. W. F. Gardner (South Eastern Gas Board) said that about two years ago a committee of chemists, of which he was a member, was engaged on the task of preparing a brochure on the sampling of solids, including coal, coke, refractories, and purifying materials, for use in the works laboratories of the South Eastern Gas Board. It soon became apparent that, whatever sampling schemes were recommended, they would inevitably be compromises between high accuracy and what was practicable in each particular works having regard to the labour and sampling apparatus available. These considerations led them to draft their recommendations so as to provide for a wide range of conditions, depending on the local personnel to select the sampling procedure best suited to their resources. In this connection, some knowledge of the theoretical background of sampling would be essential and it was regarded as necessary to provide either some references to suitable publications, or a brief exposition of their own. After a considerable search, the conclusion was reached that there was no publication having the required qualities of simplicity, accuracy, and readability, and they were forced to take the alternative course. Now, however, the position had been changed with the presentation of the paper by Mr. Badger.

It was interesting to have an outline of the work carried out in recent years to find a theoretical basis for arriving at the variability of coal. Despite all this work, however, there did not seem to be any significant progress towards a theoretical assessment of variability. The more the problem was examined the more intractable it appeared. Much of the work was concerned with coals of relatively high ash content. He was under the impression that most of the coal used in the gas industry was in the low or medium ash class. This

being the case, care should be taken in applying the conclusions of experiments with coals of the 15%-35% ash type to the gas industry. Otherwise, rather too pessimistic a view might develop regarding the possibility of accurate sampling of coal, whereas in many cases the conditions were favourable rather than the reverse. But out of all this work on variability, one useful development had come in the form of a simple method for checking the accuracy of a sample. The decision as to the number and size of increments to be taken must usually be based on some sort of estimate of variability, which might or might not be near the truth, and left an element of doubt as to accuracy. By the simple device of collecting alternative increments in separate bins and working up two samples instead of treating all the increments as one sample, and comparing results for the two samples, a warning might be obtained of inadequate sampling.

In some respects it was a pity that the term known as 'average error' had been supplemented by 'standard deviation.' Although the latter was appropriate for the mathematician, average error had the virtue of simplicity, lent itself more readily to mental arithmetic, and did afford to the non-mathematical a picture of the error involved in a set of figures. It would be some time before it was replaced by standard deviation in cases where an approximate guide as to accuracy, for everyday use, was all that was needed.

A number of examples were given in the paper showing how closely errors conformed to a Gaussian distribution, and they could amplify this from their own work. For example, as long ago as 1934 an extended study of the breeze content of low temperature coke by the old South Metropolitan Gas Company gave a distribution very close to the theoretical. In more recent times the same agreement with theory had been found for the specific gravity of silica refractories and the iron content of fireclay refractories. In this connection, where a fireclay refractory was liable to contain excessive iron due to nodules of ironstone in the raw clay, a quality control chart would be an excellent means of detecting any relaxation of vigilance at the mine in excluding impurities.

Statistical Surveys of Silica

The section dealing with the variability of silica material was of particular interest to them as they were making statistical surveys of silica material at the same time as the Fulham laboratory. The surveys were made independently, and at the time unknown to one another, and a comparison of the results was likely to be of much significance as an indication of the reliability of these statistical methods. One maker's product was represented by some 270 samples which gave a mean value of specific gravity of 2.334 with a standard deviation of 0.007, from which it was concluded that the material was very well fired. Another maker's product, represented by 43 samples gave a mean value of 2.351 and a standard deviation of 0.017, which indicated the presence of an appreciable proportion of poorly fired material. In fact, a small proportion of the samples showed specific gravities exceeding 2.380 and some batches had to be rejected on account of inadequate firing. It was not out of place to observe that a check on the adequacy of firing of silica material became most important in times of fuel shortage, and recent experience had shown its value.

A strong case could be made for being more severe in rejecting material of high density where the size of the individual pieces was large and the structure for which they were intended was a massive one. Bricks with densities approaching 2.40 were beginning to show high permanent linear expansions—for example, 1% for a density of 2.389. A small expansion, say 0.5% or less, might possibly be accommodated by the joints in the structure without ill effects, but large expansions, especially when confined to a few pieces distributed irregularly throughout the structure, might lead to concentration of load on small areas, giving rise to fractures. These considerations had led them to the view that for massive silica structures material with specific gravity in excess of 2.360, or, better, 2.350 should be virtually excluded. This could be achieved by specifying a mean value and an appropriate standard deviation that would ensure that the Gaussian curve fell virtually to zero at the desired upper limit of density.

Data on the sampling characteristics of purifying material both new and spent would be of considerable interest. The commercial value of these was based on test results, and discrepancies between pairs of laboratories, usually due to sampling errors, then became very troublesome.

Dr. R. H. Griffith (London Research Station, Gas Council) said it was clear that the gas industry would have to be more concerned with sampling in one way or another in the near future, and if they were to get the best return from the efforts which they had to devote to such sampling, it was very important that they should understand the principles laid down in the paper. It was so easy to waste effort in sampling—to do much more than was necessary under some conditions or to do too little; either of those faults led to incorrect sampling and very often to incorrect conclusions. He urged members of the Institution to spend the time and thought necessary to master the contents of the paper and to work out for themselves the proper conditions of sampling which met their own circumstances, particularly by the application of duplicate sampling.

The Author's Reply

Mr. Badger, in a brief reply, dealing with the theories of coal sampling, said they had to do experimental work, particularly in the variation between increments, in order to see whether these theories would help in drawing up the specification by which they could classify their coal by some quality other than—or in addition to—the ash content. In the present specification, the coals were given in groups, with a range of about 5% in the ash content; and it was laid down that they must take so many increments for any particular group. These theories gave some hope that they might be able to work out some other index which might be related to the method of mining or transport.

They used the pragmatic approach and found that they could not make use of either of these factors. He did not say they were wrong, but they did not seem to help, and the method of duplicate sampling was put forward by Mr. Brown and should prove a very useful tool.

They deliberately did the tests on coals of the highest ash content in order to treat the most difficult cases. In any specification they must legislate for the most difficult coal. If they took an average of those they had examined, there was a chance that their particular allocation was on the wrong side of the average. They must specify sufficient increments to cover the worst case, but he agreed that in the gas industry it was likely that coals were not so difficult. It might be that the objection which was sometimes made that the whole thing was too elaborate could be met by the use of duplicate sampling if it could be shown that a simpler procedure was all right. They could not criticise the standards on this basis; the worst cases must be provided for.

He certainly agreed that they should have trained samplers. It was no use spending a lot of time on the analysis when samples were not representative, but the method of duplicate sampling gave a check on the way the sampling was being carried out. They had only to ask a man to divide his gross sample into two by putting the increments into separate bins and then analyse each separately. That need not go on for ever, but for perhaps 10 days or a fortnight. They could then see whether the difference between the two pairs was greater than it ought to be.

So far as silicas were concerned, he was glad to have confirmation of the variability. He agreed that probably the most variable were those with the highest density, because if the consignment as a whole had been rather underfired, it was likely that it had been unevenly fired, although that was not necessarily the case. They had had a consignment where the mean density was as high as 2.36 and the standard deviation as low as 0.007. That came from a good maker during the war. Probably what happened was that the kilns were evenly heated although possibly owing to the fuel shortage they were all not quite sufficiently fired.

THE SECOND ANNUAL CONVENTION of the British Wood Preserving Association at Cambridge last June was attended by 160 members and delegates, representing producers, distillers, and users of all kinds of wood preservatives. Besides the presidential address of Major A. G. Saunders, a total of 12 papers were presented and discussed during the three days of the convention. The Association has now published a 192-page *Record of the 1952 Annual Convention,* containing the papers and discussions in full and in summary, together with a full list of of those attending. A note issued with the *Record* says it is felt that members may wish to order further copies, which are available at 8s. 6d. inclusive of postage. It is urged that early application should be made to the Association at 6, Southampton Place, London, W.C.1.

CALORIFIC VALUE CONTROL

By J. T. VERYARD, B.Sc., M.Inst.Gas E., M.Inst.F.
South Eastern Gas Board

From a paper to the London and Southern Section of the Institution of Gas Engineers, October 21, 1952.

NEXT to waste gas, the most easily obtained diluent for calorific value control is producer gas. The plant for its production is simple and requires little attention apart from the refilling with coke and removal of clinker and ashes. In large plants even these operations can be carried out mechanically. The output of a producer can be varied over quite a wide range without materially affecting the quality of the gas, and this flexibility of production makes producer gas ideally suitable to meet the variations in the volume of diluent required. It is not surprising, therefore, to find that the practice of dilution with producer gas as a means of controlling calorific value is widely adopted, the plants ranging from small suction producers directly connected to the vacuum main in the retort house to large pressure producers similar to water gas generators. It is not uncommon for a water gas generator to be operated as a producer as a means of reducing output, when a decrease in the demand for gas would otherwise entail the slow firing of carbonising plant. The conversion is usually effected by fitting a steam blower to the blast main and sometimes by restricting the grate area as well.

Between these two sizes of plant are the many producers fitted with steam blowers, by which the quantity of producer gas admitted to the coal gas is regulated. The calorific value of the final gas is thus controlled by varying the steam supply to the blowers. The flexibility of this type of producer is not as great as a suction producer or a pressure producer fitted with an air fan. With reduction in the steam supply the efficiency of the blower as an air compressor falls off, the proportion of steam to air increases, and the quality of the producer gas is adversely affected.

Advantage of Suction Producer

A suction producer has an advantage over a pressure producer in that the supply of producer gas need not necessarily be interrupted when the clinker and ashes have to be removed. With a pressure producer the volume of gas is controlled by the supply of air under pressure, which naturally ceases when the fire is cleaned. This disadvantage does not obtain when there is more than one producer and the load can be redistributed on those at work.

Since producer gas is generated to heat the carbonising plant it would appear that the retort house producers would be the most convenient source of supply of gas for dilution purposes. Several attempts have been made to put this into effect. In one such case pipes were inserted into the back of a number of internal producers below the nostrils in the combustion chamber. Each pipe led down to a common collecting main sloping towards a seal at the end of the retort house and fitted with a number of water or liquor sprays. From the seal the main rose vertically via a control valve to the coal gas vacuum main. Difficulty was experienced, however, with deposition of dust, and variations in the volume used as a diluent affected the heating of the settings. In spite of its apparent simplicity this method of obtaining producer gas for dilution purposes does not appear to have been adopted to any great extent, and cannot be recommended.

Whatever the source of producer gas, difficulty is usually experienced through the deposition of dust, tar, and water in the connections between the producer and the point of admission to the coal gas. Combination of the three produces a sticky mass, too near a solid to drain out and too near a liquid to be blown or sucked out. Spraying hot liquor into the mains appears to be the best method of preventing the deposit accumulating and causing a blockage. To avoid this difficulty the producer gas may either be admitted hot before the tar and water are able to condense, or, if the producer gas has to travel a long distance, or if it is required to be measured accurately, it should be cooled and washed immediately it leaves the producer.

Where a carbonising plant is heated by a battery of external producers and the producer gas supply to the settings can be kept at a constant pressure, it is an easy matter to draw off some of the producer gas for use as a diluent. For many years the control of calorific value at the Old Kent Road works was effected by this means.

With a simple type of suction producer of 12,000 cu.ft. per day capacity in use in Sussex, apart from reduction of the retort house vacuum when the retorts are opened for charging, the calorific value of the mixed gas is controlled solely by regulation of the valve admitting producer gas to the vacuum main.

Modern suction producers have been installed during the past few years at Rotherhithe and Vauxhall, to control the calorific value of the gas by the addition of producer gas instead of by waste gas as formerly practised.

The valve regulating the addition of producer gas can be operated either by hand or through a relay system from the gas control room. At both stations a system of automatic control is now in operation.

Because of the presence of unavoidable tar fog and dust in producer gas, no packing is employed in the washing towers, effective and trouble free cleaning and cooling being obtained by the use of water sprays. The type of nozzle employed and the positioning of each at the top of the tower ensures a uniform rain of water as a washing medium, with little entrainment of water with the gas.

Dilution with Blue Water Gas

In comparison with producer gas, the production of blue water gas requires a more costly plant with at least one attendant, and has not the same flexibility of output. The rate of production is more or less fixed by the size of the plant, any variation from the normal ratio of blow to run being attended by an increase in the amount of coke used per unit volume of gas made. The rate of production has to be greater than the average demand for the diluent, with the result that the plant has to be shut down intermittently for periods the length of which depends on the capacity of the relief holder and the difference between the output of the plant and the average demand for diluent.

Compared with producer gas, the production of blue gas is thermally less efficient and although figures of over 60% have been obtained when a plant is operated consistently at its rated output, in practice the waste of fuel during shut down periods results in the average thermal efficiency rarely exceeding 55%.

The fuel required for blue water gas production needs to be close graded and hence is more valuable than that which can be used in producers. Furthermore, the discharge to the atmosphere of grit and sulphur dioxide in the blow gases is a disadvantage not obtained in the production of producer gas.

Much of what has already been mentioned when comparing blue water gas with producer gas applies equally to car-

(Continued on p. 213)

buretted water gas. The overall thermal efficiency of carburetted water gas production is slightly greater than that of blue water gas, but this is due to the higher efficiency at which the oil is cracked into gas. As already stated, the cost of a therm of oil gas is very high and additional plant is required.

The great advantage of carburetted water gas over both producer gas and blue water gas is that the calorific value may be easily varied over a wide range. This advantage affords a means not only of adjusting the total production of mixed gas at the required calorific value but also provides an alternative method of counter-balancing the variations in the calorific value of the coal gas. With the other diluents, these variations are met by adjusting the volume of the diluent. When diluting with carburetted water gas the volume admitted may be kept constant, but its calorific value altered. Carburetted water gas plant can accordingly be kept working consistently at its rated output.

For this method of control, the capacity of the relief holder must not be unduly high; otherwise the time for a change in the calorific value of the carburetted water gas to become effective constitutes a serious disadvantage.

Dual Advantage

The dual advantage of control of calorific value and gas output by adjustment of the calorific value of the carburetted water gas may be illustrated best by an example. If a 10 mill. per day coal gas plant is expected to produce gas at 550 B.Th.U., it will make 55,000 therms per day. A 5 mill. per day carburetted water gas plant adjusted to make gas at 400 B.Th.U. will make 20,000 therms per day. Together, a make of 15 mill. at 500 B.Th.U.—*i.e.*, 75,000 therms—is obtained. If now the calorific value of the coal gas drops to 540 B.Th.U. the rate of coal gas production drops to 54,000 therms per day; but if the calorific value of the carburetted water gas is raised to 420 B.Th.U. to restore the calorific value of the mixed gas to 500 B.Th.U. the carburetted water gas therms are raised to 21,000 per day, and together 15 mill. cu.ft. at 500 B.Th.U. is obtained.

Expressing this simply by equations:—

(i) $(10 \times 550) + (5 \times 400) = (15 \times 500)$

(ii) $(10 \times 540) + (5 \times 520) = (15 \times 500)$

For the purpose of the example, it is assumed that the volume of carburetted water gas at the higher calorific value remains unchanged. Actually it will be increased by approximately 1% per 10 B.Th.U. increase in calorific value so that the increase required in the calorific value should be approximately 2% lower.

The increase (or decrease) A required in the calorific value of the carburetted water gas to counter-balance a decrease (or increase) B in the calorific value of the coal gas may be calculated with sufficient accuracy from the formula:—

$$A = B\frac{(V)}{(W)}$$

Where V = rate of coal gas production and
W = rate of carburetted water gas production.

For material changes in the make of the coal gas, the calorific value to which the carburetted water gas must be adjusted is given by the formula:—

$$\text{Calorific Value of Carburetted Water Gas} = \frac{(V + W) \times \text{required C.V. of mixed gas} - V(\text{C.V. of coal gas})}{W}$$

This formula holds good for any decrease in the make of the coal gas, but as the volume of coal gas increases, the calorific value for the carburetted water gas decreases to that of blue water gas, at which point the calorific value of the mixed gas can no longer be controlled by adjusting the calorific value of the carburetted water gas alone. An increase in its volume becomes necessary, or a diluent of lower calorific value than blue gas is required.

Dilution with carburetted water gas may be regarded as the reduction of the calorific value of the coal gas to the declared value using part of the blue water gas contained in the carburetted water gas, the remainder of the blue gas and the oil gas constituting the production of carburetted water gas at the declared value. The greater the calorific value of the carburetted water gas used, the higher is the proportion produced at the declared value.

When the carburetted water gas and coal are metered separately and the calorific value of each is known, the relative proportions at the declared calorific value can be accurately determined, the only assumption that might be required being the calorific value of the blue water gas. If this is known, the quantity required to bring the coal gas to the declared value can be calculated. Addition of this to the coal gas, and subtraction from the carburetted water gas, give the two quantities at the declared calorific value.

This calculation is not possible, however, when the coal gas and carburetted water gas are mixed before purification and only the total make is known, but there is a simple method of estimating the relative proportions.

The method is based on the assumption:—

(i) That a reasonably accurate figure can be taken for the calorific value of the blue water gas contained in the carburetted water gas.

(ii) That approximate figures can be obtained for the volume and calorific value of the oil gas made per gallon of oil used.

From these assumptions the volume of carburetted water gas made at the declared calorific value per gallon of oil can be calculated.

The volume of oil used is generally known with a fair degree of accuracy and hence the make of carburetted water gas at the declared calorific value can be obtained. Subtracting this from the total make gives the make of coal gas at the declared calorific value.

It is seldom that advantage is taken of the ability to vary the calorific value of carburetted water gas as a means of controlling the calorific value of the mixed gas and, generally, carburetted water gas plants are operated to produce gas at a constant calorific value and the mixed gas is adjusted by the addition of another diluent. The reason for this may be prejudice to making frequent alterations to the rate of oil injection or to the method being impracticable due to the considerable delay in the knowledge of the calorific value of the gas being produced.

A Bad Practice

Fundamentally, it is bad practice to use either waste gas or producer gas as a diluent when carburetted water gas is being made at less than the maximum output, since, in the production of the total quantity of gas, expensive oil gas therms are being used which could be replaced by blue water gas therms. There may be cases, however, when labour costs and holder capacity are taken into account, where the use of two diluents in the course of a day may be an economic proposition.

Comparison of the yield of coal gas at the declared value compared with the calculated figure for the equivalent thermal yield based on the hydrocarbon enrichment value of the coal gas will indicate the extent to which best use of the carburetted water gas as a diluent is being made.

Before leaving the subject of dilution with carburetted water gas, a brief description of the salient details of a plant recently installed at the East Greenwich works might be of interest. The plant consists of four Humphreys and Glasgow 'labourless' sets, each capable of producing approximately 3 mill. cu.ft. per day of either producer gas (115-120 B.Th.U.), blue water gas (290-295 B.Th.U.), or carburetted water gas (400-500

B.Th.U.). An additional air blower and additional air mains are provided for producer gas manufacture, a butterfly valve in the air branch to each generator changing the supply from one blower to the other.

When producer gas is being made a clutch cuts out the whole of the automatic controller with the exception of the charging mechanism. The producer gas can be passed through the waste heat boiler via a connection between the outlet of the boiler and inlet to wash box, the normal connection between the inlet to the boiler and the wash box being closed by a movable plate. This connection also allows the up-run gases as well as the blow gases to pass through the boiler when blue gas is being made. The advantage of this arrangement is that more steam can be produced. When carburetted water gas is made, the connection is closed by another plate, the normal inlet to the wash box opened up, and the usual cycle of operations followed.

The hot gas leaving the plant is cooled and washed, and passes via a relief holder and booster to a separate stream of purifiers. The relief holder, capacity 185,000 cu.ft., is fitted with the high and low level alarms and a safety device which stops the booster when the holder crown is in danger of being pulled in. The purified diluent passes through a butterfly valve and joins the purified coal gas at the inlet to the main works booster. The calorific value of the diluent is recorded and the volume required to adjust the calorific value of the mixed gas is regulated by the butterfly valve which is controlled pneumatically from the booster control room.

Often the only point at which the calorific value of the gas is determined with any degree of accuracy is at the inlet to holders. This entails no great difficulty in the control of the calorific value when the diluent and the coal gas are mixed after purification. Assuming the gases are adequately mixed, the effect of any alteration made to the volume of the diluent can become evident in a short time, since the purified gas can be brought to the calorimeter in a matter of seconds and there is only the time delay of the instrument itself.

Considerable Variations

When, however, the admission of diluent to the unpurified gas is regulated from knowledge of the calorific value at the inlet to holder only, considerable variations occur at this point. To avoid the time delay in knowledge of the calorific value of the gas it is best to sample either before or after the addition of the diluent or, if two instruments can be afforded, at both points. This entails the sampling of foul gas. In the past, various forms of flame indicators capable of working on partly purified gas have been employed to judge the calorific value. A few of these are still in use, and some retort house operators place far too great a reliance on them. Where the gas is straight coal gas, changes in the calorific value can be detected, and after considerable experience can be assessed; but in the case of mixtures of gas—for example, coal gas and carburetted water gas—such instruments are completely unreliable. The more accurate calorimeters are therefore essential, and the gas must be purified. Careful consideration should be given to the rate of sampling, length of test service, and volume of the purification vessels if the time taken for the gas to reach the calorimeter is to be kept to a minimum.

For many years attempts have been made to adjust the calorific value of gas to the required standard by some form of automatic device. All depend in the first place on the movement which takes place in some part of a calorimeter when the calorific value of the gas changes.

Several forms of controller depend on the movement of a relay valve attached directly to the expansion tube of a Sigma recording calorimeter. The relay valve controls, either by hydraulic or pneumatic pressure, the loading of the exhauster governor or, through a diaphragm and valve, the volume of diluent added to the coal gas. J. G. Stewart described several forms of these controllers in a paper published in the *Gas Journal* of October 24, 1928. Some of these devices are claimed to be proportional controllers—that is, the device makes an adjustment that is proportional to the departure of the calorific value of the gas from the required standard.

Automatic controllers of a new type were installed recently at Rotherhithe and Vauxhall. At both works unpurified gas is sampled, but by bringing the gas to the purification system as quickly as possible, and designing this to the minimum volume, the time delay for the gas to reach the calorimeters is no more than 5 min. At Rotherhithe a recording calorimeter of the water flow type is employed and a further 3 to 4 min. delay occurs before a change in calorific value can be recorded. At Vauxhall, a recorder of the inferential type is used in which the time delay is no more than a minute and a half. The principles governing the operation of these automatic controllers has been fully described recently by J. R. Kenward in the *Gas Journal* of February 4, 1952. Briefly, both these recorders can produce a pneumatic signal which is a function of the deviation between the calorific value being recorded and the desired calorific value. This signal is then employed to operate the valve controlling the admission of the diluent.

Deviations of 3% are obtained with manual control, 2% with automatic control operated from a water flow recorder, and 1% with automatic control operated from an inferential recorder.

At East Greenwich the diluent gas and coal gas are mixed after purification so that the time delay for the sample of gas to reach the calorimeter need only be a matter of seconds. On the other hand, the volume of the diluent required will vary not only as the volume and calorific value of the coal gas changes, but also as the diluent changes from producer gas to carburetted water gas. A controller has accordingly been installed to maintain the ratio between the flow of gas and the flow of diluent at any desired value. This ratio can be set automatically by the calorific value controller to obtain the mixed gas at the required value. This system of control has only recently been installed, but as a result of the very short time delay for a change in calorific value to be recorded, it appears that it may be maintained within 0.5%.

COAL STOCKS POSITION

DETAILS of coal stocks as at December 27, 1952, compared with those available at December 29, 1951, are given in the following table, issued by the Ministry of Fuel and Power. Figures in parentheses, mainly calculated on the basis of requirements during the winter, indicate the total of weeks which the tonnage in stock would last.

Week ended:	Dec. 27, 1952	Dec. 29, 1951
	Thous. tons	Thous. tons
Distributed stocks—		
Public-utility undertakings—		
Gas	2,920 (4.5)	3,032 (4.9)
Electricity	5,298 (6.6)	4,914 (6.3)
Water	87(13.4)	81(12.5)
Railways	844 (3.0)	720 (2.5)
Coke ovens	1,013 (2.0)	912 (1.9)
Industrial consumers—*		
Iron and steel	511 (3.0)	611 (3.6)
Engineering and other metal trades	617 (5.2)	721 (6.1)
Other industry	3,036 (4.2)	3,620 (5.0)
Total, all industry	4,164	4,952
Merchants' stocks—		
(*a*) House coal	1,444	1,169
(*b*) Anthracite and boiler fuel	118	96
Miscellaneous (estimated)	809	358
TOTAL DISTRIBUTED STOCKS	16,697	16,234
Colliery stocks (on ground and in wagons)	†	1,078
Open-cast stocks (at sites or central stocking grounds)—		
Saleable	2,619	191
Second quality	493	160
TOTAL	3,112	351

* Undertakings with an annual consumption of 100 tons or more of coal and/or coke.
† Not available.

Planning for Better Sales and Service

By W. J. STEED, M.S.M.A.,

Sales and Service Manager, Sheffield and Rotherham Division, East Midlands Gas Board

From a paper to the Yorkshire Junior Gas Association

AT the time I was preparing my basic notes for this paper, a leader appeared in the *Gas Journal* (September 10, 1952). Under the heading 'Disquieting Evidence' the leader drew attention to recent figures published in relation to the sales of electricity and electrical appliances. It also drew attention to the decline in gas appliance sales and went on to say, under the heading of 'Back to Selling': 'There are, we suggest, a number of partial solutions to this problem but one is obvious, we must start selling again and as quickly as possible. As we see it the danger lies not so much in the present restrictions—for they must surely be lifted before very long—but in our industry's ability to sell. We are in competition with much more than electricity—makers of furniture, television, bicycles, to name only a few, all are jockeying for position to divert the narrowing stream of public expenditure. For the consumer the choice may be between a new cooker and going away on holiday next year; only salesmanship can tip the balance in favour of gas. It is now 13 years since gas was really sold. Post-war activities may be discounted on the grounds that the industry only met the demand, it did not create it. Many of the younger men in our sales force today have never really sold anything, they have been merely a midwife in a sale which simply had to come. Selling needs practice. Without it the salesman grows rusty and sometimes even his ambition fades. This dreadful inertia attacked both the gas and electricity industries simultaneously and both have suffered equally. What is now plain is that the industry which recovers its selling ability first will come out on top.'

The leader went on to point out the improvements in design and performance of electrical appliances *and* that the 'has been' solid fuel cooker bears no resemblance in performance or appearance to its successor.

I quote the final paragraph: 'Thus we are in a cruel world and the winds of competition will blow ever more keen. If we move fast, if we reorganise and train our sales force, and if we can gear promotional publicity to the new standards required, we have no doubt that the enviable prestige of gas will be maintained. But if we fail in any one of these, those sales figures will keep on going down and it will be many a long day before the public spending power reaches the level of the past six years.' That the foregoing is a true statement of affairs as they exist cannot be questioned.

Anticipatory Action

I believe that the plan of reorganisation that has been evolved for the Sheffield and Rotherham division of the East Midlands Gas Board is one of anticipatory action inasmuch as it will justify our belief that we have faced up to the fact that the original organisation was not a creative force, that there was a good deal of inertia existent, and that the service to the consumer was limited to an extent that the enviable prestige of gas could not have been maintained.

The considerations which must be examined in the setting-up of any sales and service organisation are so diverse that it is practically an impossibility to lay down any hard and fast plan. Any plan which is designed to establish organisation must therefore be flexible.

The personnel establishment, while being undoubtedly the chief consideration, should be designed in conjunction with other factors which must inevitably influence its strength and disposition. Its operation is dependent on factors which, if not known, must be ascertained or the planner can find himself with a force that is either insufficient in strength or wasteful by over-establishment.

The following are only representative factors that cannot help but influence the design of the force and its ultimate objective: Geographical areas in which it will operate; types of community to which it will market and serve; climatic features and conditions (which have a marked effect on selling procedures); population density of areas; industrial and residential proportions and characteristics; and, in the case of the gas industry, gas and distribution availability.

Studying the Potential

It is essential that in designing the plan the potential market is also studied.

In the past too often has the organisation been set up (and this applies not only to sales and service organisations) with a carefree inconsideration for the facts and there has been much wishful thinking. It is quite wrong to build an establishment which it is hoped will earn its keep, instead of assessing the labour force which will justify an anticipated potential.

At the outset the establishment for the organisation of sales and service in the Sheffield and Rotherham division was determined by a careful consideration of the foregoing factors. For instance, it was found that the varying geographical areas in the division demanded specific consideration. Communications, influenced by hills and the like, all affected the determination of district and sub-district boundaries and locations of operatives.

Likewise, communities were studied and their habits and customs examined. It was found, for instance, that in certain areas there was a marked habit and custom to shop in centres despite crowded conditions which prevail as a result —Sheffield communities are particularly prone to this custom —while in other areas a marked difference was found in shopper density in town centres. There was found also the communities that preferred to travel to neighbouring towns rather than transact their business in a perfectly good shopping centre situated in their own areas.

Showroom facilities were assessed in accordance with these findings as also were the requirements of representatives.

Climatic conditions have a decided influence upon the mentality of the individual. Temperatures are responsible for breeding entirely different temperaments. There is a natural love of home where low temperatures prevail and I give as an example the rather remotely scattered areas of the Derbyshire borders where it is considered that the outdoor establishment must inevitably be stronger than say that which will be necessary in the more southerly region.

Population density is also an extremely important factor in the considerations of the potential. Selling is undoubtedly much easier in denser areas due to the neighbourly contacts that exist. Service is also considerably easier due to the shorter distances involved. In such conditions establishment to handle the potential can, in certain circumstances, be expected to be smaller. The reverse may have to be considered in a widely scattered area.

Types of industry can play a most important part in the determination of markets.

(Continued on p. 218)

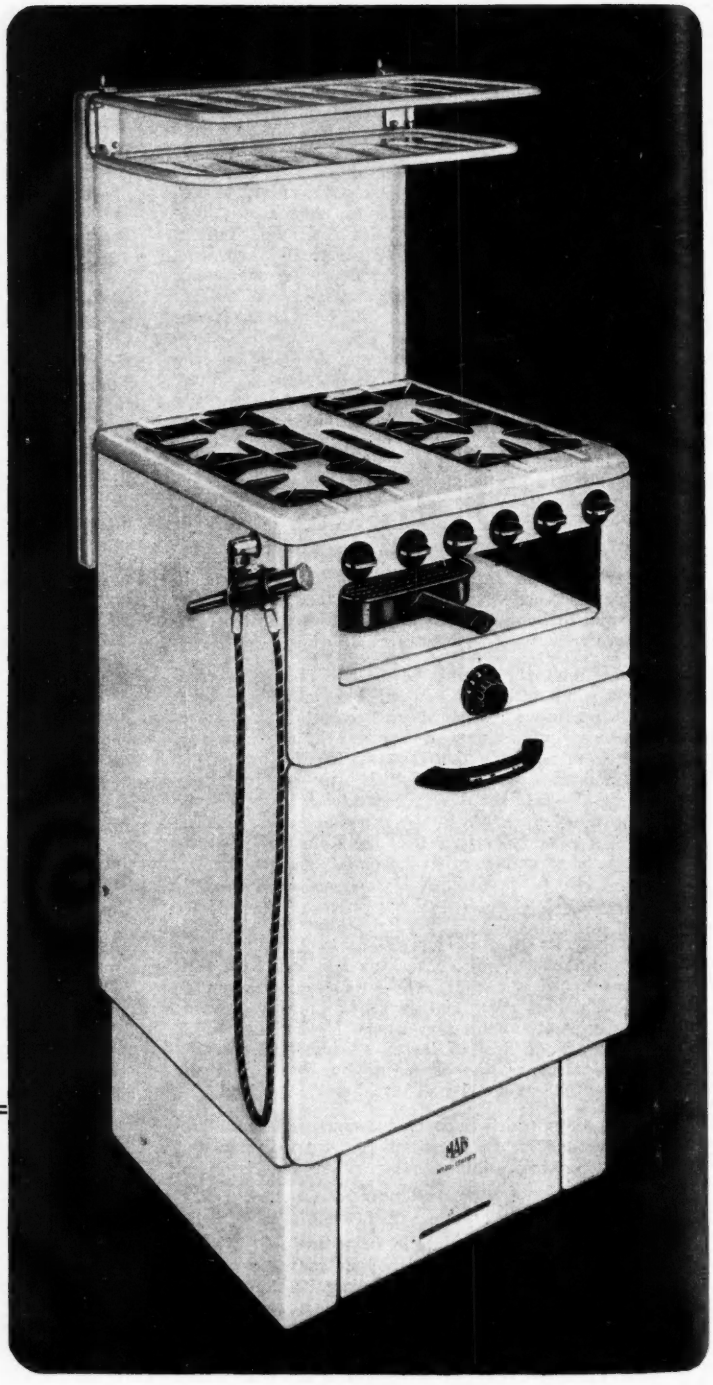
No. 20 CENTURY

The luxury Cooker at a moderate price

PROVIDES A HIGH STANDARD OF PERFORMANCE COMBINED WITH EASE OF MAINTENANCE

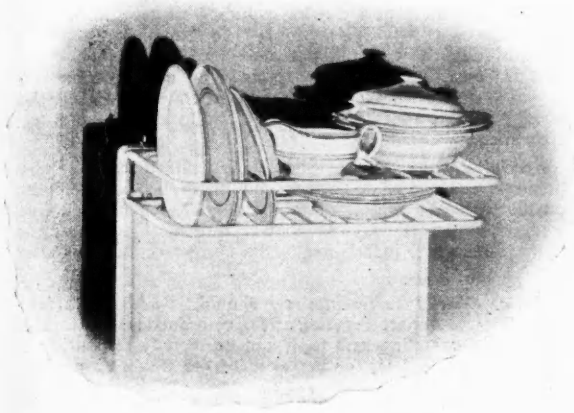
The No. 20 Century is of advanced design and constructed primarily of sheet steel. No chassis is used; its great strength and solidity being achieved by the use of large steel panels with deep flanges bolted together.

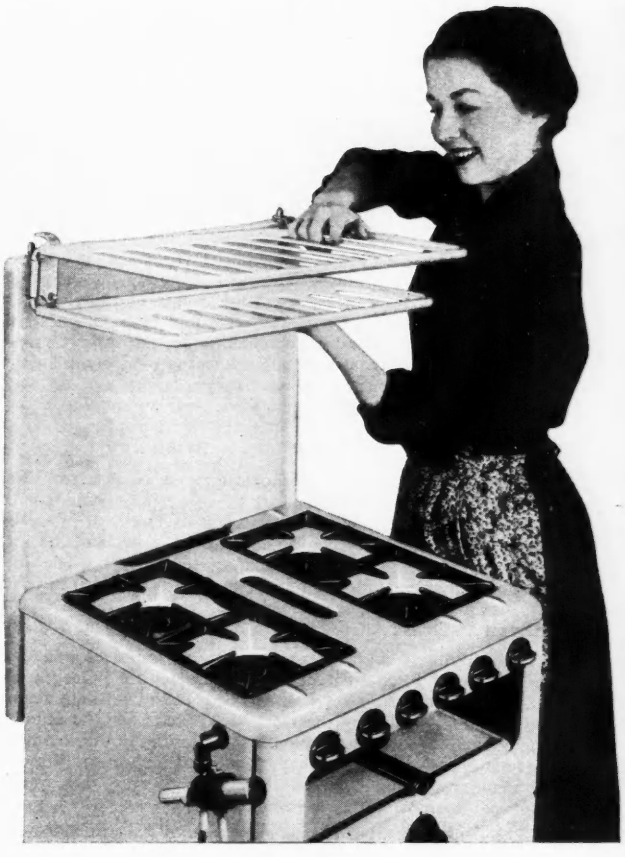
The overall dimensions of the Cooker are 36 ins. high, 20¾ ins. wide and 20 ins. deep. With back-plate and platerack the height is increased to 53 ins. and the depth to 20¾ ins. overall.



MAIN

R. & A. MAIN LIMITED
LONDON AND FALKIRK





The convenience of its one-piece double platerack

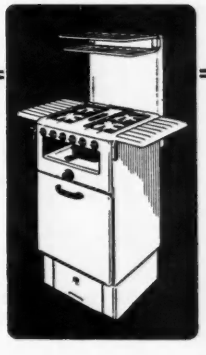
The platerack of the No. 20 CENTURY cooker is of stamped steel and is finished in vitreous enamel. It is hooked to pins on top of the backplate and is easily lifted off for cleaning or when necessary to accommodate a tall steamer on the hotplate. The double rack will hold up to sixteen plates standing on edge (two in each slot) or alternatively, four large plates of food can be placed on its two shelves when dishing up.

The enamelled backplate is self-supporting and requires no arms. It is rigidly secured to the back casing of the oven by means of two screws at either side.

Fitted with Hotplate Extensions

In CREAM Vitreous Enamel

Gas Cooker



452

It is axiomatic that sales of gas or appliances must be determined by gas and distribution availability and it is of little use setting up a concentrated sales and service force in an area where it is known that shortage of gas may prevail either by shortage of plant or indifferent supply by inadequacy of mains system. Here I would refer to the excellent service which has been introduced by the East Midlands Gas Board in its market surveys. Three have so far been carried out. The first investigated the potential cooker market, the second the water heating market, and the third made an investigation into existing consumer service.

If such surveys were available to the sales and service planner covering all aspects of gas requirements, appliance requirements, consumer service requirements, and the like, then the job of planning an organisation would be a comparatively easy one, as in each sample obtained under the various surveys would emerge automatically all the factors which must determine the organisation.

The Organisation

The Sheffield and Rotherham division extends north-east to Thorne on the borders of Lincolnshire, south-west to Wirksworth in Derbyshire, eastwards to Misterton, again on the borders of Lincolnshire, and westwards to Tideswell in Derbyshire. The area covered is some 1,600 sq. miles and the total number of consumers approximating to 346,000. The total number of undertakings in the division is 32, included in which are, to quote the larger, Sheffield, Rotherham, Doncaster, and Barnsley. Divisional headquarters are established at Sheffield.

Industrially it is predominantly noted for steel and coal, together with large areas devoted to agriculture. Geographically, two-thirds of the division can be said to constitute acutely hilly country, including the Derbyshire Peaks and the undulating country of the West Riding, and extending to the somewhat flat and wooded areas of Lincolnshire and Nottinghamshire. Its borders are within the counties of Yorkshire, Derbyshire, Nottinghamshire and Lincolnshire.

The division has been, or is in process of being, divided into eight districts and the whole has been functionalised for operational purposes under specialised services of engineering and manufacture, gas distribution, and sales and service. The functions of accountancy, personnel, and establishment control, stock control, and similar services have also been set up under their respective divisional officers.

Each district has, or will have, its respective functional officers—that is, an engineer, a mains engineer, and a district manager, each of whom is responsible to a respective functional officer at divisional headquarters.

In the case of sales and service, the district manager is delegated with the whole of consumer service within the district apportioned to him, and the function of this side of the Board's organisation is regarded as covering all consumer service from the inlet of the meter, including the operation of showrooms, publicity, public relations, home service, and the like.

Early after vesting day the Board produced a pattern showing the function and organisation of sales and service. It was elastic enough to provide for the considerations expressed in my opening paragraphs. The organisation makes provision under the control of the divisional sales and service manager for district manager, special representative, senior district representatives, new building representatives, district representatives, home service advisers, gas fitting foremen, district clerks, and gas fitters.

It is intended that such specialists as central heating representatives, industrial representatives, and catering representatives should be based at divisional headquarters and that they will operate under the control of the appropriate divisional officer.

The definition of functions of sales and service personnel below that of divisional sales and service manager has been decided upon as follows:—

District Manager.—Qualified by experience and training to undertake the control of all sales and service and the day-to-day administration of a district, including all necessary clerical work involved for all functions. The administration and responsibility for all buildings and offices other than works. The responsibility for meter reading and collection and the day-to-day cash transactions of the district. The organisation of all transport allocated by division and located at the district concerned.

Special Representatives.—Should be qualified to advise non-domestic consumers or professional men, such as architects, on the particular aspects of the work indicated by their title. They should work in close contact with local administrative units, particularly in relation to the correct charging of work carried out.

Senior District Representative.—Should, in addition to functioning as a district representative, co-ordinate the work of the section operating as a team and be directly responsible to the next senior officer for the work of the whole team.

District Representative.—Should be qualified technical salesman responsible for advising domestic consumers on matters relating to gas and coke and for maintaining consumer relations within an area containing up to 10,000 consumers (dependent on consumer density). He should be primarily responsible for the promotion of appliance sales and be capable of advising on and estimating for any domestic installation. He should be responsible for settling disputed accounts and other queries.

District Gas Fitter Foreman.—Should be administratively capable and technically qualified to supervise fitters carrying out work in accordance with the written instructions of the representatives or necessary servicing of installation and equipment. He should, if necessary, be equipped with a van carrying small quantities of pipe and fittings and special tools.

District Clerk.—Should be the administrative link between the representatives, the foreman, the stores, and the accounts department. He should deal with the job tickets and should issue them to the foremen as directed by the district representative. So far as practicable he should accept all reports and telephone calls from consumers or members of the undertaking's staff relating to district work within his own district.

Home Service Adviser.—Qualified by examination in the appropriate subjects and capable of dealing with consumer enquiries on all domestic and commercial appliances, the arranging of cookery demonstrations and lectures, homecraft courses, the formation of branches of the Women's Gas Federation, and advice to domestic science and like bodies.

Gas Fitter.—Should be a qualified craftsman capable of carrying out fitting work and the servicing of installations and equipment.

Support Force

In conjunction with the setting up of any organisation it is obvious that the overall ramifications of the task force must be considered. In a sales and service organisation in the gas industry these may be considered to fall broadly under the following headings: Training and education; marketing policy; installation policy; uniformity and control of prices; general information service; advertising, publicity, and public relations; showrooms sales; and home service.

The East Midlands Gas Board has set up a central training establishment. One of its functions is designed for and established to cover the training of all categories of sales and service personnel. From its inception it has been devoted almost in its entirety to the training of district representatives. Other additional short courses have been arranged, but priority has been given to the training of the former who are considered to be, both now and in the future, the most important link in the pattern of the organisation.

The marketing and installation policies are initially deliberated by various committees established under the chairmanship of the Board's commercial manager. The findings

are submitted for consideration and approval of the divisional general managers and finally, subject to the approval of the Board, are issued through the department of the commercial manager.

Two methods operate to ensure that the information as issued reaches all concerned.

(a) Through a standard price register which is held at the headquarters of the division and districts.

(b) Through an appliance and installations register which is held at levels down to the showroom. A service manual is issued which gives technical information on the installation of appliances and servicing, which is issued through all grades down to and including fitters.

In addition to the foregoing, an advice and information service in the case of the Sheffield and Rotherham division is issued from divisional headquarters and is circularised in accordance with known factors and requirements through district managers.

Results show that the methods employed do ensure that policy, pricing, and practice cannot help but be uniform.

The majority of advertising and publicity is created and issued from Board headquarters. The Board does, however, grant each division a certain amount of freedom in respect of certain advertising and publicity, particularly that which emanates from showrooms and from home service departments, and the inevitable occasion that demands immediate action. A considerable amount of divisional freedom in the creation of window displays, etc., is also allowed and district managers are in fact encouraged and expected to exercise initiative in this direction.

Mobile Exhibition Unit

Great success has accompanied the mobile exhibition unit recently produced by the Board. This unit is a prime mover, is completely self-contained with its equipment of gas, display material, home service kitchen, and film projection equipment. It is manned by a sales staff and its primary object is to provide the divisions with a first-class mobile showroom in accordance with requirements.

Showrooms and their establishment can provide what is perhaps the most important link in any sales support force. At a number of undertakings in the Sheffield and Rotherham division it is unfortunate that prior to vesting there had been a general neglect of either the provision or the maintaining of adequate showrooms and their establishment. The whole position has been reviewed and provision has been, or is to be, made for adequate premises to be available and the right establishment made for the setting-up of showrooms at every centre in the division where this can be justified.

I believe one of the most powerful tools that the sales manager can have at his disposal is an active and well trained home service department. We have established in the division a team of 14 home service advisers, divided into two groups, each of which consists of one senior adviser and six advisers. The teams have been allocated to units where facilities exist for them to operate properly, each adviser working under the respective district manager.

While home service advisers are not expected to sell direct they are trained to a high level of efficiency and are competent to deal with any consumer enquiry in respect of any domestic or catering appliance. They are expected to sell if the need arises, and to undertake from time to time showroom and exhibition duties.

Inter-departmental Co-operation

In the planning for better organisation of a specialised department, the necessity for introducing and maintaining first-class relations with other functional departments cannot be over-emphasised. Too often in the past the various departments have, by virtue of the importance that they have placed upon their particular function, unconsciously or otherwise isolated themselves and their establishment to the detriment of the efficient working of the whole.

In this respect the sales and service side of the industry has not been blameless. There was a time when the importance of sales and service was to some extent not given its proper place. There is little doubt in my mind, however, that this state of affairs has passed and the gas industry as a whole has appreciated that the machine can never operate at its highest efficiency unless there is complete balancing and co-ordination of functions, and an appreciation by the various functions of each other's activity and importance.

In planning for better sales and service, the Sheffield and Rotherham division have tried to keep two feet on the ground and have realised that there could have been, if we had not been extremely careful, some thinking and planning in terms of visions which may appear to be fair from afar, but which do not all of them work out in practice as in theory. We have realised in the division that accountancy, gas manufacture and distribution, industrial relations, costing, and all other ramifications of any organisation must play an equal part to ensure the fulfilment of a better scheme of things. The sales and service department does not intend to set itself upon a pedestal; neither will it empire-build without a belief that its expansion will be to the betterment of the seller and the buyer.

STOPPING A GAS LEAK

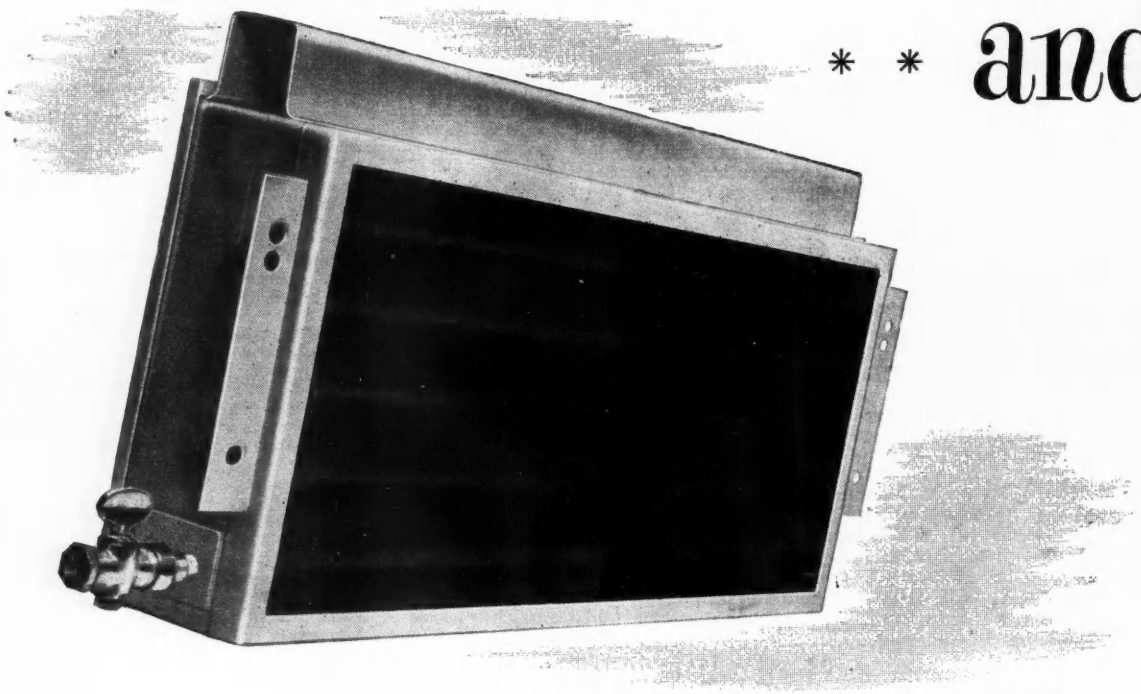
ADVANCES in knowledge of the behaviour of certain hydrocarbon constituents of oil deep underground which should lead to the recovery of millions of barrels of valuable fuel which has hitherto been lost as escaping gas are reported by the California Institute of Technology. In 1927 two chemical engineers attached to the Institute undertook an investigation of the behaviour of oil gases for the American Petroleum Institute. With collaborators they studied the effects of pressure on liquid and gaseous hydrocarbons, and in particular they investigated oil in a curious phase known as 'retrograde condensation.' The Californian experiments have provided a scientific explanation of the fact that whereas gases subject to high pressure are normally compressed into liquids, in certain conditions deep underground some of the components of oil are vapourised under enormous pressure, and have enabled methods of control for recovering the gases to be devised. After 25 years' work, research has reached a point where its directors believe they have learnt the behaviour traits of a significant fraction of the industrially important hydrocarbons as they exist underground. They are now launching a campaign aimed at determining the characteristics of petroleum constituents involved in the changes during recovery from oil reservoirs. Automatic calculating machines have been developed to predict the behaviour of oil constituents over a wide range of temperatures and pressures. An electric 'digital computer' at the Californian Institute is said to be able to predict the properties of single hydrocarbons at pressures up to 10,000 lb. per sq. in. with 'reasonable success.'

MANCHESTER'S SMOKELESS ZONE, the subject of a recent television feature, has been a success. In a letter to the *Manchester Guardian* on January 16 Alderman C. E. P. Stott, Chairman of the North Western Gas Consultative Council, said the fact that an experiment on so large a scale could be carried out so smoothly is evidence of the tact of the officials of the health department and demonstrates that the area covered can be expanded. The annual report of the cleansing department, which does not cover the period the smokeless zone has been in operation, indicates substantial co-operation by the general public in clearing the atmosphere by utilising the modern coke grate. The refuse collected has changed from cinder to dust and effected a reduction of 20,000 tons per annum. The nature of the refuse demonstrates how complete has been the combustion of the fuel. Alderman Stott considers that coke should be made available at a cheaper price than Grade 3 coal and properly graded.

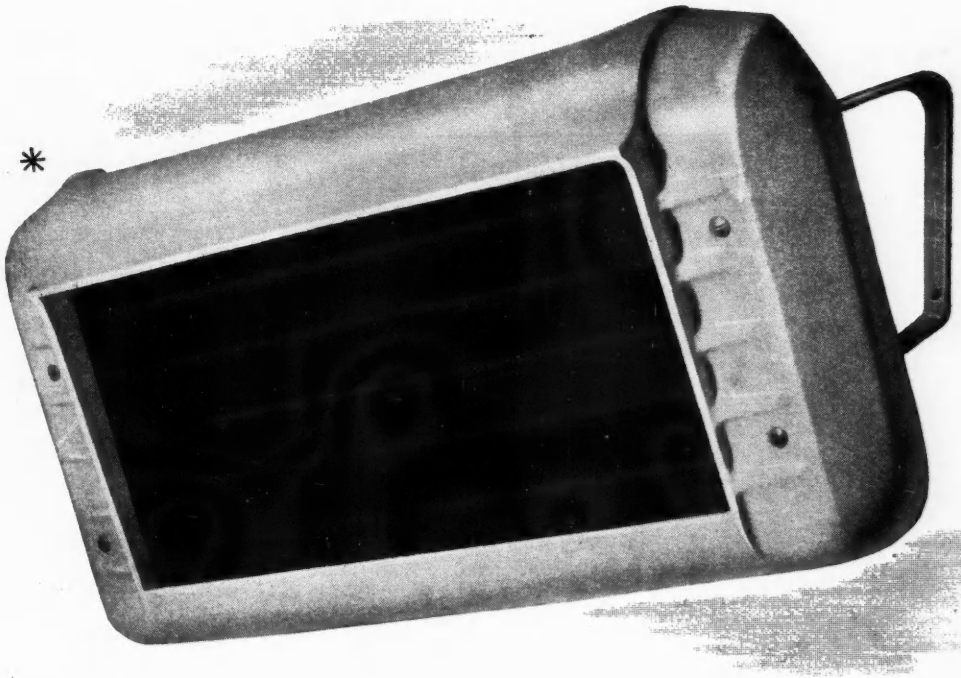
We serve two masters

Yes, *two* masters . . . for we serve not only the Gas Industry, but its huge public as well. For the one we help to safeguard an enviable reputation for integrity : for the other we provide the efficiency, economy, and comfort of high quality appliances. That we are able to satisfy the best interests of two such demanding masters at one time will we think speak well of the De La Rue organisation—*that we are able to serve them to their mutual benefit we* know *will speak volumes for De La Rue equipment.*

* * and



m-a-g-n-i-f-i-c-e-n-t-l-y



two managements * * *

Yes, *two again.* Built into scientifically designed tunnels, our gas-fired infra-red panels quick-dry an impressive assortment of manufactured products from bicycle frames to processed films—saving up to 90% of the stoving or drying time. *And the same panels (suitably stylized) also keep people warm.* In churches, hospitals, shops, workshops, and offices the application of radiant heat saves money by increasing efficiency ... in fact the advantages of Gas heating are seldom more dramatically demonstrated than in this field of radiant heating. After all, there must be some benefit in heating only the object to be dried—only the human being to be warmed, and *not* the intervening air!

DE LA RUE INFRA RED SPACE HEATERS

THOMAS DE LA RUE & CO. LTD. (GAS GROUP)

Imperial House, 84/86 Regent Street, London, W.1. • Telephone: Regent 2901

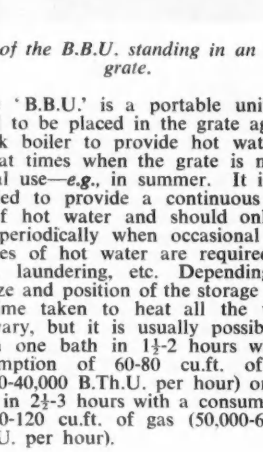
TRADE NEWS

Main Water Heaters

A NEW gas appliance introduced by Main Water Heaters, Ltd., is the back boiler conversion unit, or 'B.B.U.'

View of the B.B.U. standing in an open grate.

The 'B.B.U.' is a portable unit designed to be placed in the grate against a back boiler to provide hot water in bulk at times when the grate is not in normal use—***e.g.***, in summer. It is not intended to provide a continuous supply of hot water and should only be used periodically when occasional bulk supplies of hot water are required for baths, laundering, etc. Depending on the size and position of the storage tank, the time taken to heat all the water will vary, but it is usually possible to obtain one bath in 1½-2 hours with a consumption of 60-80 cu.ft. of gas (30,000-40,000 B.Th.U. per hour) or two baths in 2½-3 hours with a consumption of 100-120 cu.ft. of gas (50,000-60,000 B.Th.U. per hour).



Back boiler conversion unit showing the steel frets and adjustable levelling strap.

The 'B.B.U.' consists of a welded sheet steel casing housing a refractory brick in a metal frame with two interchangeable heat resisting steel frets. The burner fitted at the base comprises 16 jets so fitted that the flames make an angle of 45° with the float. These heat the frets to incandescence whereby heat is transmitted to the face of the boiler. A levelling strap enables an adjustment of up to 2 in. in height to be made and the tilt can also be regulated to ensure that the heating surface of the appliance makes maximum contact with the back boiler.

Weighing only 8¼ lb. the unit is completely portable with an insulated carrying handle, and when fitted with a flexible connection it can be plugged into any convenient gas point.

A gas throttle with cover cap and a pressure testing nipple are provided in the gas inlet.

Finished in aluminium paint, the 'B.B.U.' has an overall height of 10¾ in. (maximum), 8¾ in. (minimum), width 9⅜ in. and depth over handle of 6½ in.—*Main Water Heaters, Ltd., 48, Grosvenor Gardens, London, S.W.1.*

R. A. Lister

FROM R. A. LISTER & CO., LTD., we have received particulars of two new general purpose power loaders. These are 16 ft. and 26 ft. loaders. The 16 ft. type has a maximum delivery height of 12 ft., while the 24 ft. type has a maximum delivery height of 18 ft. Outstanding features of the design are lightness in construction combined with strength and manœuvrability. The power loaders are so balanced that one man can move and position the machine for correct loading and delivery. Approximate weight of the 16 ft. type is 7 cwt., of the 24 ft. type 10 cwt. Drive for the loaders is provided by a 2½ H.P. air-cooled petrol engine (electrical motor drive can be fitted if desired).—*R. A. Lister & Co., Ltd., Dursley, Gloucestershire.*

Trade Publications

ALLEN ENGINEERING REVIEW for January, 1953, published by W. H. Allen, Sons, & Co., Ltd., of Bedford, contains interesting articles on power and process steam for a large textile mill, embodying the first British industrial turbo-alternator with epicyclic gearing; on waste heat recovery from diesel engines; diesel generating plant in Sydney; and water pumping installations. There are technical contributions on Fretting, Corrosion and the Parallel Operation of Alternators.

E. BOYDELL & CO., LTD., Elsinore Road, Old Trafford, Manchester 16.—Illustrated brochures giving particulars of the firm's latest Muir-Hill 10 BD dumper and SS loader. The dumper has abundant power, compact dimensions, and outstanding ease of manœuvrability. Other features are the Muir-Hill patent rotating seat and steering, simple instantaneous gravity tip and reset, and good visibility. The Muir-Hill loader is a very fast machine and is economical to operate. Changes have been made to the power unit and gearbox, together with certain chassis and suspension developments, of these two machines. The dominant feature is the adoption of diesel as standard.

BRITISH TYRE AND RUBBER CO., LTD., Herga House, Vincent Square, London, S.W.1.—Illustrated leaflet dealing with B.T.R. vibro insulators. The technique of these insulators consists in the use of rubber in shear instead of compression for the absorption of unwanted frequencies. B.T.R. vibro - insulator machinery mountings are rubber springs bonded to metal supports and used in shear to give spring deflections greater than hitherto achieved. They are manufactured in a range of sizes and designs to cover a wide field of applications from delicate scientific instruments to massive machines such as compressors and vibrating screens.

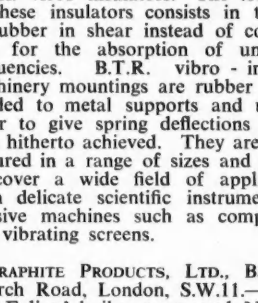
GRAPHITE PRODUCTS, LTD., Battersea Church Road, London, S.W.11.—Leaflet on 'Foliac' boiler compound No. 260. This compound is for scale removal and the leaflet, which is illustrated, gives the experience of a user who applied the compound to the internal surfaces of a 3 ft. × 8 ft. dia. Lancashire boiler after it was descaled and cleaned down for

Parkinson Stove Co.

PICTURED HERE is the Parkinson Stove Company's recently-modified 'Paravex' portable gas heater. Efficient and economical, the 'Paravex' weighs only 14 lb. and can easily be carried from room to room—wherever casual or supplementary heating is wanted. Its highly-polished chromium plated reflector ensures even distribution of heat.

Special feature of the fire is the dress guard, designed in full accordance with British Standard safety requirements. Available in three colours — golden brown, eau-de-nil, and cream—it has a gas consumption of 12 cu.ft. per hour.

The 'Paravex' is 21½ in. high, 15⅞ in. wide, and 6½ in. deep.—*Parkinson Stove Co., Ltd., Terminal House, London, S.W.1.*



inspection by the insurance surveyor. 'The scale,' the leaflet states, 'came away quite easily and on the under surface the graphite film was apparent. In the steam space of the boiler the graphite coating remained as if the boiler had not even been steam-raised and the metal remained in perfect condition . . . Compound No. 260 acts as a very satisfactory parting medium and enables scale to be chipped without the arduous labour usually encountered with this job . . . Due to its corrosion inhibiting properties and making scale removal easier, the effective life of the boiler will be increased and the performance improved.'

MORGAN CRUCIBLE CO., LTD., Battersea Church Road, London, S.W.11.—Illustrated leaflets describing Morgan lift-out and tilting crucible furnaces. Type L.O. (lift-out) will handle melts ranging from light alloys to special irons and steels, and in various capacities up to 350 lb. (brass). Melting is carried out under metallurgically clean conditions. The protection of the metal by the crucible from direct flame contact ensures minimum losses from oxidation and avoids overheating. The Morgan central axis tilting furnace is most popular for general foundry use. It is economical and is a rapid melter, its robust construction enabling it to withstand many years of hard foundry use.

ROBERT JENKINS AND CO., LTD., of Rotherham, have issued a very nicely produced catalogue illustrating some of their wide range of manufactures from domestic boilers to chemical plant and from galvanised tanks to stainless fractionating columns. There are pages which show the firm's capacity in various departments and there are photographs of special and recently installed plant. Among their specialities are welded storage tanks for both liquids and compressed air, the latter having a working pressure of 150 lb./sq. in. Also included in this catalogue are graphs for obtaining plate thickness of fusion welded mild steel air receivers to British Standard Specification. The publication is entitled 'Welded Fabrication.'

GRIFFIN & TATLOCK, LTD., Kemble Street, Kingsway, London, W.C.2.—Leaflet GT 1,408, illustrating and describing the G.L.C. (Gooderlam) soap film gas analysis apparatus—a new apparatus based on a dynamic method for the complete quantitative analysis of gaseous mixtures. The design of the apparatus, British Patent Nos. 489,117, 550,323, has been evolved by the North Thames Gas Board (formerly Fulham Research Laboratory of the Gas Light & Coke Co.) and the firm during the past 10 years. The apparatus is now available in a form which is convenient to use, and is capable of producing accurate results in the analysis of town and other gases more rapidly than any other apparatus known to the firm. Average time for an analysis of town gas or other gaseous mixture of similar composition, after an initial period for flushing, is 3 min. The apparatus is designed to give a degree of accuracy of $\pm 0.1\%$. Analyses are repeatable within the same time of 3 min. and may be carried out by unskilled personnel after brief instruction.

Thos. W. Ward

THOMAS W. WARD, LTD., Sheffield and branches, have been appointed official general distributors of the 'Wetherill-Hydraulic' loading shovel. This loader has such sensitive scoop and side arm control that its use is not limited to shovelling and loading of loose materials; it can load and stack bales, barrels and other bulky items. Three scoop sizes are available, ¾ cu. yard, 1 cu. yard, and 1¼ cu. yard, and maximum loads up to 1 ton can be carried.

Fitted with a dozer blade, the 'Wetherill-Hydraulic' is capable of most levelling, piling, and spreading jobs, and the Fordson Major tractor to which the Wetherill mechanism is fitted affords ample power for all conditions of service.

The major points in 'Wetherill-Hydraulic' design are:—High discharge position and low headroom; constant power when engine is running; controlled discharge of scoop and rate of lift or lower; automatic cut outs and overload control.

The firm has also been appointed official general distributors of the 'Staffa' mobile crane.

This is a versatile general purpose crane which has a forward mounted jib, with its derricking action hydraulically operated, fixed in line with the chassis and counterweight to give maximum stability under all conditions of load and ground conditions.

Constructed to lift 2-3 tons, the 'Staffa' has standard type car controls and the hydraulic luffing mechanism is finger tip controlled from the normal driving position.

With the jib horizontal the crane has an overall height of slightly more than 10 ft. In this position the lifting capacity is 1½ tons, which adds considerably to the value of the crane for interior work—as, for example, the unloading of box rail wagons, etc.—*Thos W. Ward, Ltd., Albion Works, Sheffield. London Office: Brettenham House, Lancaster Place, Strand, W.C.2.*

COMPANY NEWS

MIDLAND TAR DISTILLERS

Consolidated trading surplus year to June 30 £460,969 (£407,969), plus investment income £4,169 (£4,895). Deduct depreciation £119,289 (£116,999), directors' and auditors' remuneration £29,848 (£29,167), bank and loan interest £5,139 (debenture interest £373), provision for contingent liability £5,000 (£12,000), tax £97,895 (£121,395) and tax equalisation account £77,000 (£31,600), leaving net profit, £130,967 (£101,330). Ordinary dividend 8% (same). Consolidated current assets £1,722,455 (£1,539,390), including stocks £564,519 (£582,744), debtors £1,127,338 (£927,644) and cash £4,461 (£12,322). Current liabilities £1,609,422 (£1,140,425), including sum due to bankers £250,335 (£8,078), temporary loans £125,000 (nil) and trade creditors £1,021,310 (£919,400). Capital commitments £1,095,000 (£550,000).

COLONIAL GAS ASSOCIATION

The report of the directors of the Colonial Gas Association, Ltd., for the year ended June 30, 1952, presented at the 64th annual general meeting of the company in Melbourne, on October 15 last, showed net profit, after providing £177,000 for taxation, at £139,130. Adding to this £16,609 brought forward from the last accounts and deducting the interim dividends paid in April and the final dividends recommended, leaves a balance at credit of the appropriation account of £40,245. The net profit is a return of 6.5% on the shareholders' funds. The directors recommended dividends at the rate of 8% per annum on the preference shares (less interim dividend of 4% paid in April, 1952); and at the rate of 7% per annum on the ordinary shares (less interim dividend of 3½% paid in April, 1952); that £34,063 be transferred to general reserve; and that £6,182 be carried forward to the next account. Sales increased by 11.8% and the sales of subsidiary gas companies by 4%. Throughout the whole period, the coal received has been of inferior quality and its price and sea freights have increased further, necessitating increases in the price of gas. Action by the Gas and Fuel Corporation to acquire the Victorian business of the Association appears to have become remote on account of the present financial stringency.

POWER GAS

The 53rd annual general meeting of the Power-Gas Corporation, Ltd., was held on January 21 at 39, Victoria Street, London, S.W.1, Mr. N. E. Rambush, D.SC.(HON.), M.I.CHEM.E., F.R.S.A., Chairman and Managing Director, presiding. In his statement circulated to the shareholders, the Chairman pointed out that in comparing the consolidated trading profit of £720,870 and other figures with those for 1951 as shown in the accounts it should be borne in mind that for the purpose of giving a fair comparison with 1952 the 1951 figures had been adjusted to include the full year's results of the Rose Downs and Thompson companies which became subsidiaries in the course of that year. The net profit attributable to the parent company for 1952, including its holdings in the subsidiaries, was some £37,000 higher than for the preceding year. After careful consideration the board was pleased to recommend the payment of a dividend of 14%, representing a moderate increase over the 12½% paid since 1940. The orders booked by the group during the year, totalling nearly £7 mill., exceeded by over £1 mill. the bookings in any previous trading year. The strength of the group lay to a large extent in the variety of fields in which they specialised, covering iron and steel, chemical, gas, petroleum and edible oil industries.